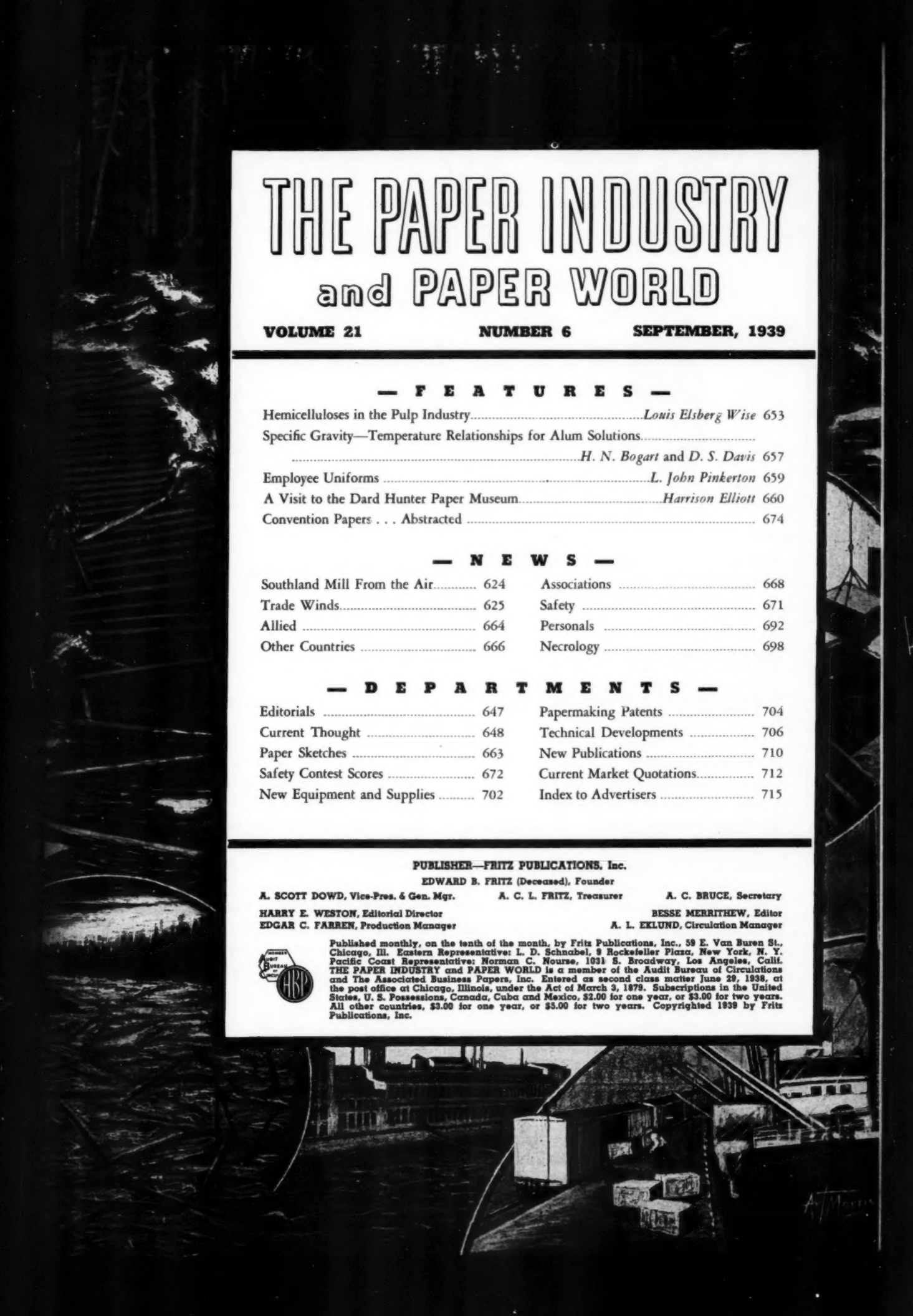


THE PAPER INDUSTRY and PAPER WORLD

VOLUME 21 **NUMBER 6** **SEPTEMBER, 1939**

— FEATURES —

Hemicelluloses in the Pulp Industry ..... *Louis Elsberg Wise* 653

Specific Gravity—Temperature Relationships for Alum Solutions ..... *H. N. Bogart* and *D. S. Davis* 657

Employee Uniforms ..... *L. John Pinkerton* 659

A Visit to the Dard Hunter Paper Museum ..... *Harrison Elliott* 660

Convention Papers . . . Abstracted 674

— NEWS —

Southland Mill From the Air 624

Trade Winds 625

Allied 664

Other Countries 666

Associations 668

Safety 671

Personals 692

Necrology 698

— DEPARTMENTS —

Editorials 647

Current Thought 648

Paper Sketches 663

Safety Contest Scores 672

New Equipment and Supplies 702

Papermaking Patents 704

Technical Developments 706

New Publications 710

Current Market Quotations 712

Index to Advertisers 715

PUBLISHER—FRITZ PUBLICATIONS, Inc.

EDWARD B. FRITZ (Deceased), Founder

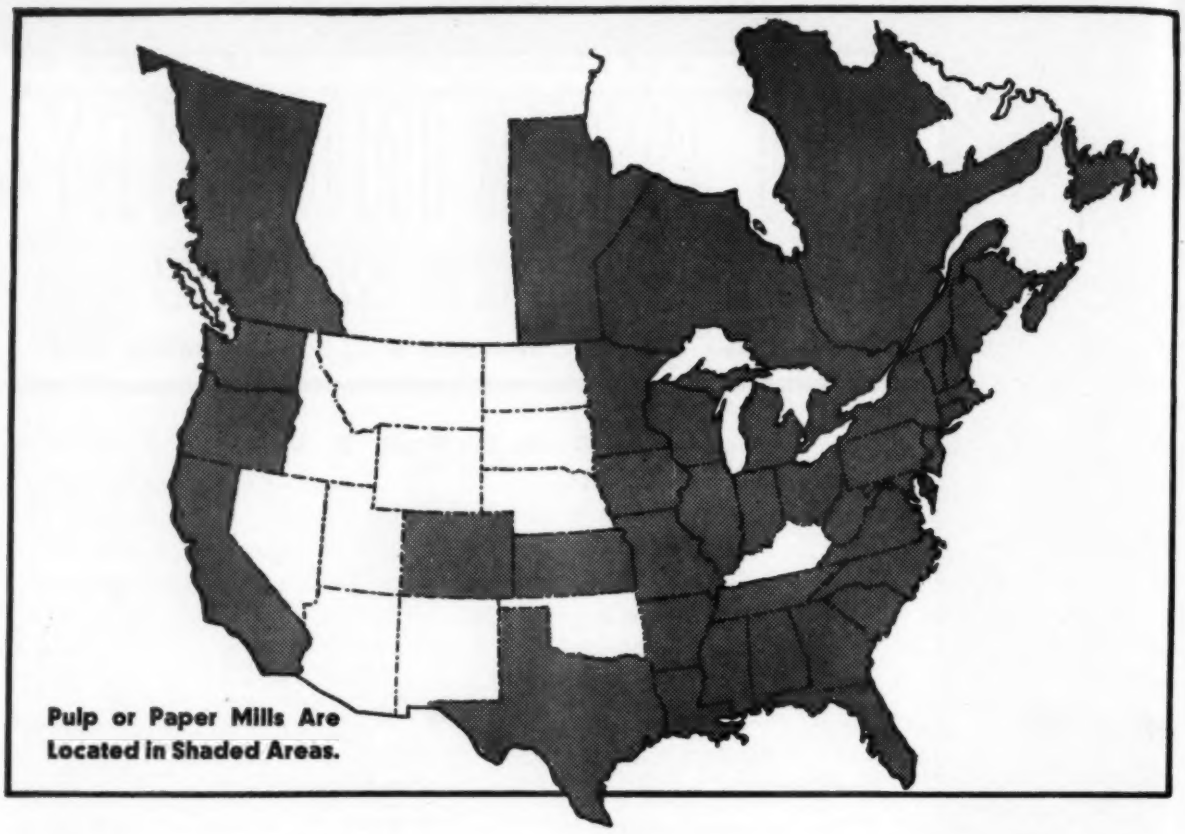
A. SCOTT DOWD, Vice-Pres. & Gen. Mgr. **A. C. L. FRITZ, Treasurer** **A. C. BRUCE, Secretary**

HARRY E. WESTON, Editorial Director **BESSE MERRITHEW, Editor**

EDGAR C. FARREN, Production Manager **A. L. EKLUND, Circulation Manager**

Published monthly, on the tenth of the month, by Fritz Publications, Inc., 59 E. Van Buren St., Chicago, Ill. Eastern Representative: L. D. Schnabel, 9 Rockefeller Plaza, New York, N. Y. Pacific Coast Representative: Norman C. Nourse, 1031 S. Broadway, Los Angeles, Calif. THE PAPER INDUSTRY and PAPER WORLD is a member of the Audit Bureau of Circulations and The Associated Business Papers, Inc. Entered as second class matter June 29, 1938, at the post office at Chicago, Illinois, under the Act of March 3, 1879. Subscriptions in the United States, U. S. Possessions, Canada, Cuba and Mexico, $2.00 for one year, or $3.00 for two years. All other countries, $3.00 for one year, or $5.00 for two years.

Copyrighted 1939 by Fritz Publications, Inc.



Pulp or Paper Mills Are Located in Shaded Areas.

Wherever there's a pulp or paper mill— Stebbins Linings and Tanks are favorably known

From Newfoundland to California – from British Columbia to Florida—wherever there's a pulp or paper mill on the North American continent, Stebbins linings and tanks stand first in the esteem of the most experienced men in the pulp and paper industries. In a large majority of the pulp and paper mills one or more vessels are equipped with Stebbins linings and in many plants Stebbins linings are used exclusively. Over 90% of all the sulphite digesters in the country are Stebbins lined, and in countless accumulators, acid towers, acid recovery tanks, acid storage tanks, bleaching tanks, blow pits, chests, washer vats, etc., Stebbins materials and mastercraftsmanship play a most important part in assuring long life and efficient, economical, trouble-free service.

If you are not already a user of Stebbins linings it will pay you to talk your lining problems over with one of our engineers. Over 50 years experience in the pulp and paper field renders us exceptionally well equipped to serve you.

SEMCO

Stebbins Engineering and Manufacturing Company

WATERTOWN, NEW YORK

ADVERTISING PAGES REMOVED

TRADE WINDS

PAPER MILL FOR PASADENA IS OFFICIALLY ANNOUNCED

▸▸▸ THE REPORT THAT the Champion Paper and Fibre Company would build a paper mill adjoining the company's present plant at Pasadena, near Houston, Texas, has become a fact. The announcement was made official by a letter from the company's executive offices at Hamilton, Ohio, the day following the special meeting of the board of directors on August 8, when complete approval was given to the plans which had originated several months ago. This will become the company's third paper manufacturing plant and will cost approximately $3,000,000. The official announcement signed by Alexander Thomson, Jr., Advertising Manager, states that the new plant will produce high grade coated papers, coated on the paper machine at high speed, for *Time* and *Life* magazines, as well as for standard grades at present manufactured by the company.

The fourdrinier paper machine, which will be built by Beloit Iron Works, will cost approximately $1,000,000, including the cost of the drive. The machine will have a wire width of 214 in., and a wire length of 115 ft. The trim will be 198 inches, and the over-all length will be approximately 400 ft. This installation, which the company claims will be the world's largest combination papermaking and paper coating machine, will have four coaters and be capable of operating at 1,500 f.p.m.

There will be considerable supplementary equipment involved, including two very modern supercalender stacks in addition to two machine stacks which will be manufactured by The Black-Clawson Company, Hamilton, Ohio. These supercalender stacks will have 10 rolls, 194 in. wide and will be the largest ever built in this country. They will be of extremely high speed, capable of operating 2,000 f.p.m., this high speed being made possible through a new type of refrigeration, in order to care for heat dissipation. Each calender stack will have a 10-ton ice making machine. It is interesting to note that the calender stacks will be 30 ft. in height, the necessary steel rolls being manufactured by the Midvale Company, Philadelphia.

The building to house the new installation will be of brick and steel construction, to match the company's present sulphate pulp plant, built in 1937. The pulp plant has a capacity of 230 tons of bleached sulphate pulp daily, utilizing Southern pine grown in the vicinity.

The building has been engineered by Champion's force with H. K. Ferguson, Inc., of Cleveland, Ohio, as consulting engineers and will be 140 ft. by 828 ft. The new plant will be of two-story construction, modern in every respect, with a three-story finishing room and three-story storage capacity. The new machine will be placed across the aisle from the existing 166-inch pulp machine, built by Black-Clawson. Merritt, Chapman and Scott, of New York City, are contractors for the building as well as for all necessary installation.

The winders are to be manufactured by Beloit Iron Works, and the Cameron Machine Company, of Brooklyn. The driving equipment is to be made by General Electric Company, and other motors, switches, and incidental electrical equipment by Westinghouse Electric and Manufacturing Company.

Champion plans to commence building operations at an early date, and expects to have its new plant in operation in approximately ten to eleven months.

FTC ACTION AGAINST MORE PAPER GROUPS

The so-called "trust-busting campaign" of the national administration which recently resulted in Federal Trade Commission action against the book paper manufacturers, and Federal Grand Jury indictment against certain Pacific coast newsprint manufacturers has as its latest objective two large groups, indicated by a Federal Grand Jury at New York. The action taken by this Grand Jury, reporting August 15, follows:

1) Indictment of various companies and officials of the Kraft Paper Manufacturers Association.

2) Indictment of members of the firm of Stevenson, Jordan & Harrison, who as the Stevenson Corporation manage the affairs of various groups, including manufacturers of paper.

3) Indictment of the National Container Corporation and its various regional groups, also under the Stevenson Corporation management.

4) Recommendation of further investigation of the National Paperboard Association, against which no indictment was returned, such investigation to include certain affiliates.

5) No action was taken against manufacturers of envelopes, who were reported in the newspapers to be, with the wallpaper manufacturers, under investigation.

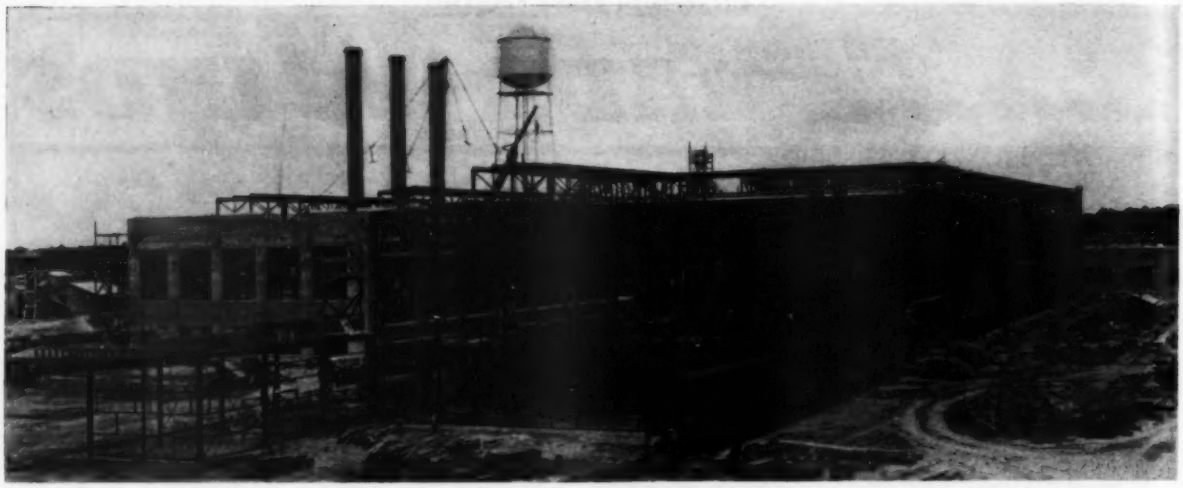
No court action resulting from the indictments will take place until October, when a bitter fight will probably be made by the defendants against the conviction sought by the Department of Justice.

The indictments contain considerable detail, but in general charge the defendants with having violated the Sherman Anti-Trust Act by sundry actions tending to curtail production and maintain prices.

The indictment against the Kraft Paper Manufacturers Association includes as defendants, in addition to the Stevenson Corporation and the Kraft Paper Manufacturers Association as such, fourteen individuals and thirty-five corporations, all the paper companies which were members of the Association from June 1935 to date.

The indictment against the National Container Association includes the parent Association and twelve regional container associations. It also includes twenty-seven corporations and twenty-eight individuals.

The presentment handed to Judge Johnson J. Hayes included, beside the formal indictment, a recommendation for further investigation into the affairs of the National Paperboard Association and Frederick G. Becker, Inc.

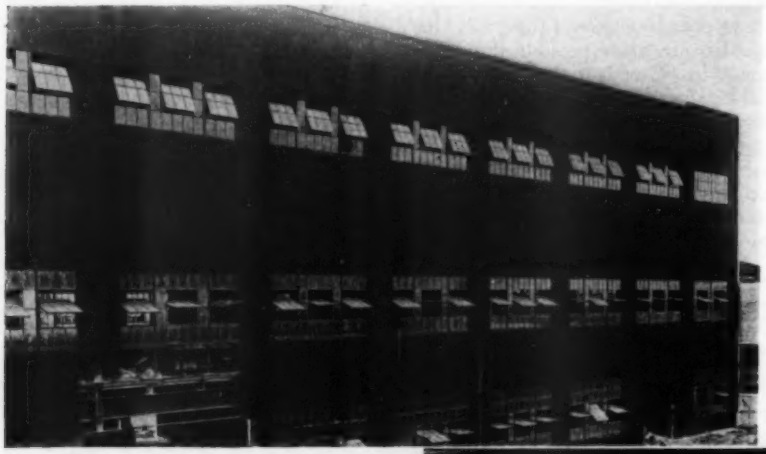


East elevation—showing machine room at right, boiler room at left, and grinder room in foreground.

LUFKIN PLANT NEARS COMPLETION

▸▸▸ THE DREAM OF EAST TEXAS industrialists—the commercial manufacture of newsprint—neared realization when the last of the steel framework for the $6,000,000 paper mill of Southland Paper Mills, Inc., Lufkin, Texas, was swung into place recently. Present indications are that the mill, which is being constructed well ahead of schedule, will begin production soon after December 1. It will have a personnel of from 800 to 1,000 employees. The brick work is seventy per cent completed and the machinery is being rapidly installed.

According to Ernest L. Kurth, president of Southland Paper Mills, Inc., the mill will begin operations with an output of 1,500 feet of paper per minute and will use 125 cords of wood a day. Within five years, Mr. Kurth predicted, the plant will have increased its capacity threefold and will be exporting newsprint to South America. Southern newspapers have already contracted for the entire output for the next five years.



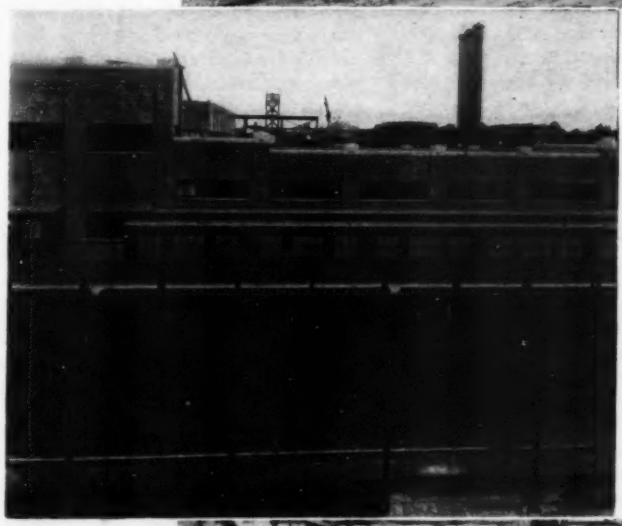
Left—North elevation of warehouse.

One side of the main building is being constructed so that another unit may be added and the output doubled—an expansion that is expected to come within the next two or three years. Leaders are predicting that smaller mills will be erected over the entire Southern pine belt after the success of the initial venture is assured.

"The newsprint development is an opportunity which may change the whole economic setup of many communities between Texas and Virginia and mean employment to untold thousands," Mr. Kurth told a forestry group recently. "Timber grown as a crop can increase the farm family income by $100 a year, which will bring a great measure of security and comfort."

The story of the new paper mill dates back to about thirteen years ago when two scientists, Dr. Charles

Right—Interior of machine room—looking west.



Above—South elevation—west portion. At left is warehouse; to right, machine room.

Holmes Herty and Francis Patrick Garvan, combined their talents and resources to further the development of the South's natural resources. With the Herty process developed, the way was opened for the first commercial application. Under the leadership of Mr. Kurth and with the co-operation of the Southern Newspaper Publishers' Association, the East Texas Chamber of Commerce and leading newspapers of the state, Southland Paper Mills, Inc., was formed.

Left—West elevation—south portion—showing warehouse.

Below—Looking north into boiler room.

MARATHON'S NEW PLASTIC PLANT GOES INTO PRODUCTION

▶▶▶ CONTINUING its research efforts to reclaim waste materials of its paper mills and to develop commercial by-products, the large Marathon Paper Mills Company of Rothschild, Wisconsin, has opened its new $150,000 plastic plant. The new plant is part of a $1,200,000 project for expanding production of newly-developed products, according to D. C. Everest, president and manager of the company.

The new plastic is made from lignin extracted from pulp mill liquors, and can be sold for 5 cents a pound or less, as compared with prices of 15 to 50 cents a pound for other plastic materials now widely used.

Guy C. Howard, company chemist, developed the process. Waste sulphite liquor is treated to recover the cooking acid, carbohydrates are extracted and a lignin sulphonic acid, called organic precipitate, is obtained. This material, known as O. P., can be manufactured at a few dollars a ton, and as developed by Marathon the material is in a form adaptable to further processing.

The plastic plant receives its materials from the Salvo Chemical Company plant, located on the paper mill grounds, which produces synthetic vanilla from lignin obtained from the Marathon company. The Salvo company obtains about 10 tons of O. P. daily from the mill, extracts the vanillin, and returns the remainder to Marathon, which receives a percentage of the selling price of the vanillin.

Part of the material turned back to the Marathon mill is sent to the plastic plant, where it is cooked with wood chips and treated to make a plastic pulp. The pulp is hauled to the Mosinee Paper Mills, where it is run over a fourdrinier paper machine to produce a molding sheet or is dried to make a molding material. The sheets, which may be laminated to produce a strong, lightweight board having, weight for weight, the strength of steel, are returned to the Marathon mill to be cut into desired sizes.

Experiments are now being conducted to use the new plastic materials for parts of automobile bodies, refrigerator doors, and products where low cost is a factor in large scale production. The discovery of the use of lignin for manufacturing vanillin and plastic materials, in fact, has led chemists to believe that another important mass source of chemical raw materials such as coal tar has been uncovered.

Besides the new plastic plant, which is a large, two-story building located at the north side of the paper mills, the Marathon company includes in its expansion program an addition to the firm's Menasha plant, where work has already been started. In addition, there will be other extensions of present facilities at Rothschild.

The addition at Menasha is the result of the growing production of a moisture-proof, heat-sealing wrapping material made from paraffin and latex, which is known as parafilm. This product now is in extensive use by processors such as Borden, Kraft-Phenix, Procter & Gamble, and others.

The Marathon company, which did a business of $11,109,000 last year, recently arranged for a $1,000,000, six-year bank loan to take care of the expansion. It also arranged for the sale of $3,500,000 of new 4½ per cent, 15-year bonds to the Equitable Life Assurance Society to retire the outstanding $1,750,000 first 5½ per cent bonds due in 1942, and about $1,700,000 in long term bank loans.

Coming at a time when the Wisconsin State Board of Health has ordered all cities along the Wisconsin River to construct sewage disposal plants and stop polluting the Badger State's major stream, Marathon's action in converting its pollution into something of value is of great interest to sportsmen and municipal officials. Waste sulphite liquor, poured into rivers at an estimated rate of 3,000,000 tons a year, absorbs free oxygen in the water, killing fish.

First the vanillin (synthetic vanilla) was extracted, and it is now being used for flavoring by many big sweets and ice cream manufacturers. Later came Maratan, a chemical for tanning hides; and then T. D. A., a chemical for improving the quality of cement. But Chemist Howard's latest—plastic—is by far of greatest importance.

FINANCIAL

WITH paper production continuing at a high figure, the European war situation caused a sharp drop in the value of securities, particularly in the few days prior to August 25 when the situation became most acute in expectation of definite developments abroad.

Meanwhile, financial reports made during the month continued to indicate a steadying of market conditions, even in the face of recurrent Administration action against various groups in the paper industry.

Consolidated Water Power and Paper Company—A net income of $574,958 is reported for the first half of 1939, as compared with $278,129 for the same period in 1938.

Dennison Manufacturing Company—A net profit of $88,000 is reported for the half year, as against a loss of $66,000 for the same period in 1938.

Dixie Vortex Company—Profits for the year ending June 30 were $819,979, as compared with $812,519 for the previous fiscal year.

Eddy Paper Corporation—First half year earnings were $68,851, as compared with $69,345 for the same period in 1938.

Flintkote Company—Twenty-eight weeks ending July 15 showed net profit of $610,331, compared with $269,627 for the same period of 1938.

Gaylord Container Company—For the six months ending June 30, net profits were $236,528, compared with $500,080 for the same period of 1938.

International Power and Paper Company—Operations for the second quarter of 1939 show a profit of $77,739, as compared with a loss of $576,181 for the same period of 1938.

Lily-Tulip Cup Corporation—Earnings for the year ending June 30 were $386,294, as compared with $359,251 for the previous year.

Nashua Gummed and Coated Paper Company—Net profit for the half year was $65,200, as compared with a deficit in the same period of 1938.

National Container Corporation—Six months' profits were $87,946, as compared with $54,299 for the same period in 1938.

Oxford Paper Company—Net profits were such for the first half year as to amount to earnings of $2.25 per prior preference stock as against 40 cents earned for the same period of 1938.

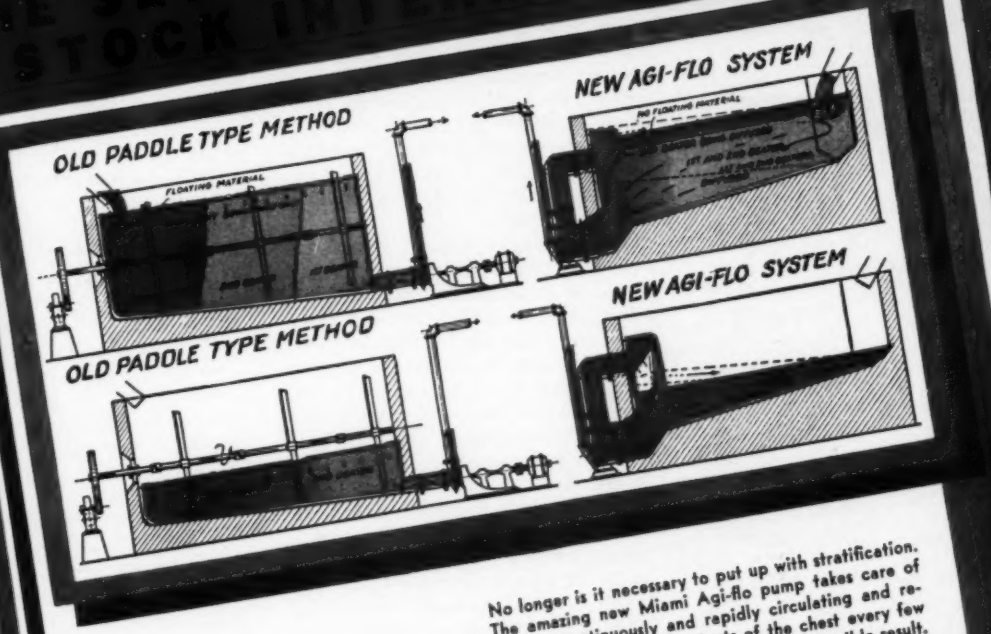
Rayonier, Incorporated—Net earnings for the second quarter were $217,516, as compared with a net loss of $183,264 for the same period of 1938.

Sutherland Paper Company—Six months' net profits were $258,919, as compared with $391,506 for the same period of 1938.

U. S. Envelope Company—A net profit for the first half of the year is

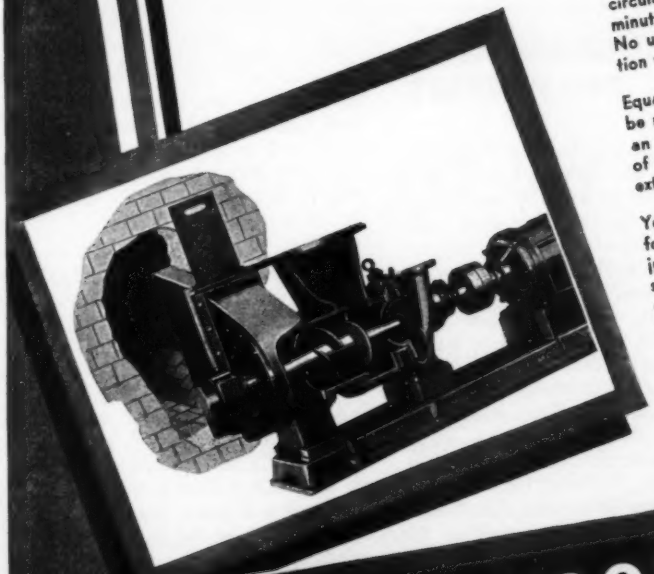
Found!

—THE SECRET OF FLAWLESS STOCK INTERMIXING



No longer is it necessary to put up with stratification. The amazing new Miami Agi-flo pump takes care of that by continuously and rapidly circulating and recirculating the entire contents of the chest every few minutes. Thorough intermixing the only possible result. No unagitated stock. No floating stock. No variation when blending colors.

Equally important, with an Agi-flo pump there can be no variation at point of delivery. In other words, an Agi-flo unit produces a constant head regardless of the stock level in the chest—and does it without extra power.



Yes, gentlemen, in the operation of an Agi-flo pump is found the secret of successful stock intermixing—not just agitation. Also obtainable is a uniform consistency delivered in constant volume. In fact, at least one mill has, by installing an Agi-flo system, been able to dispense with its machine head box entirely, as hard to believe as that may be.

If you want the ideal agitating and pumping condition above described, you want an Agi-flo system. Plenty of installations to which to refer you. Shartle Brothers Machine Company, Middletown, Ohio, Division of the Black-Clawson Company, Hamilton, O.

BLACK-CLAWSON—SHARTLE

SHARTLE

reported of $153,894, as compared with a loss of $156,855 for the same period of 1938.

Union Bag and Paper Corporation—Second quarter earnings were $78,875, as against $206,986 for the same quarter of 1938. For the year ending June 30, earnings were $575,020, as compared with $1,375,901 for the year ending June 30, 1938.

S. D. Warren Company—Net profits for the half year were $139,885, as against $99,115 for the same period of 1938.

New York Stock Exchange—Stocks

	Closing Prices Aug. 24	July 31
A. P. W. Paper	.....	2
Celotex	8⅛	11⅞
Same Preferred	64½	66
Certain-Teed Products	5½	8
Same Preferred	23½	30⅛
Champion P. & F. Co.	17	*19½–20¼
Same Preferred	100	*99–100
Container Corp.	9½	11¾
Cont. Diamond	5	*7–7⅛
Crown Zellerbach	9½	10
Same Preferred	*79–80	81
Dixie Vortex	9¾	*11–11⅞
Same "A"	32¼	33⅜
Flintkote	16⅜	21⅜
Robert Gair	2⅛	2⅜
Same Preferred	.....	*8⅛–9⅛
Gaylord Container	9½	12¾
Same Preferred	*40¼–47	*46½–49⅛
Internat'l P. & P. Co.	6⅜	9½
Same Preferred	27⅞	35
Kimberly-Clark	27	28½
MacAndrews & Forbes	*32–33	*33½–34¼
Masonite	36	43
Mead Corp.	6¼	8½
Same Preferred	62⅛	*57–62½
Paraffine Co.	39½	*46–48
Rayonier	7⅛	8⅜
Same Preferred	*13–35⅛	52⅛
Scott Paper	49	52⅛
Same Preferred	114¼	*113–114
Sutherland Paper	*24–24½	*24½–25¼
Union Bag & Paper	6¼	8⅜
U. S. Gypsum	79	91½
Same Preferred	*175½–176½	174¾

New York Stock Exchange—Bonds

Celotex 4½%	.....	90½
Certain-Teed 5½%	70¾	78⅜
Champion P. & F. Co.	101¾	104⅛
Container Corp. 5%	100	99¾
Int. P. & P. Co. 5%	97¼	99⅜
Same 6%	88½	91¼
Mead Corp.	103⅞	104¼

New York Curb Exchange—Stocks

Am. Boxboard	5½	6⅛
Brown Co. Preferred	8	*11–12¾
Det. Paper Prod.	⅞	*⅞–1¼
Great Northern	*36–37½	38¼
Hummel-Ross	*2⅜–2¾	2⅞
Nat. Container	.....	5⅜
St. Regis	1¾	2
Taggart	2¼	*3–3½
United Wall Paper	1¾	2¼

◆

▶▶▶ EXTENSIONS ARE BEING MADE to the plant of the Interlake Tissue Mills Company, Ltd., President George Carruthers announced recently. They will provide increased office and storage facilities.

ANOTHER NEW PLANT WILL RE-MANUFACTURE PULP

▶▶▶ A NEW PLANT for the de-inking of printed waste paper under the McGregor system is to be erected shortly in the Holyoke (Massachusetts) area by the newly organized New England Pulp and Paper Corporation.

The new corporation has been organized by a small group of Massachusetts businessmen for the purpose of erecting the plant to produce the pulp under the McGregor process and, it is stated, plans are being made to install additional plants at strategic points at a later date. The first unit will produce 30 tons per day.

The McGregor process was taken over from the Canadian inventor by Theodore P. Steinmetz, industrial engineer, F. B. Oldham, of the American Industrial Company of Buffalo, New York, and other experienced men. For the past three years, this group has been ironing out various weaknesses in the process and developing special machinery for continuous production of pulp by this process. The American Paper Machinery and Engineering Works, Glens Falls, New York, now builds the equipment for the new firm.

The McGregor process is a chemical and mechanical method for treating waste paper, removing all ink, filler and dirt from the paper, and converting it back into pulp which has the same physical and chemical characteristics as the pulp from which the paper was originally manufactured. In other words, it is claimed, the process makes pulp from waste paper which is the same as pulp turned out by pulp mills. It therefore can be manufactured into paper identical in every respect with the paper that had been de-inked. Samples of the pulp made by the McGregor process have been found acceptable to paper mills, a number of which, it is reported, have expressed an interest in producing their own pulp by this process instead of buying requirements as heretofore. The process is fully covered by American, Canadian and English patents.

Boiled down to its essentials, it is pointed out, the process emulsifies printing ink without harming the fibers and then washes out that emulsified ink, converting the waste paper back into clean pulp which can be pumped directly to the Jordans or can be dehydrated for shipment. A plant is now being erected at Glens Falls, New York, to produce 30 tons of this pulp daily (Cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 544, Aug., 1939).

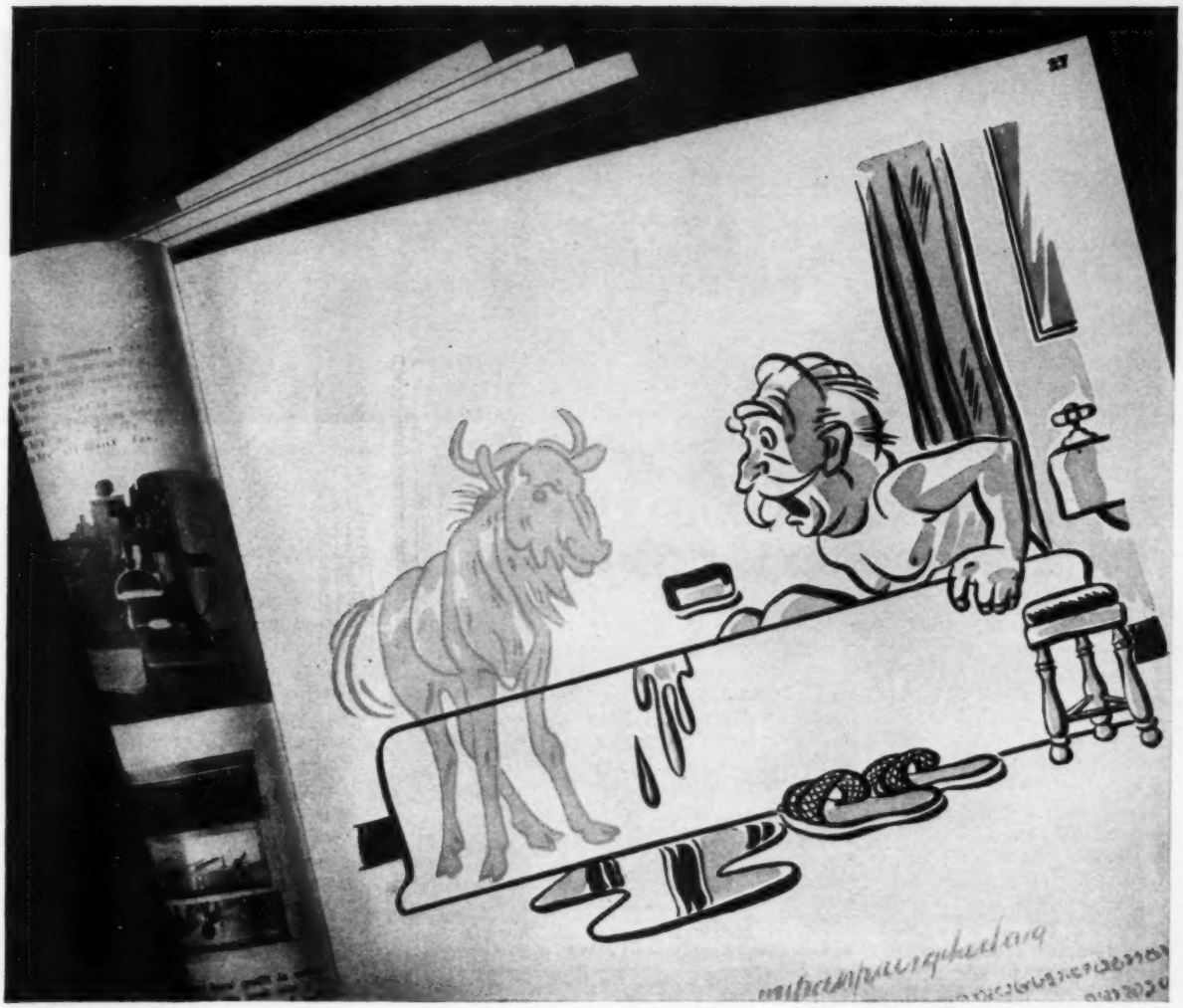
NEW ENGLAND PULP NEWS

WITH the powder keg of Europe touched off, the effects on pulp have been quickly appraised by converting mills. Gone for the present at least is all possibility of distress or dumped pulp on the market from any sources, and most particularly from Memel, and Bohemia, which together with German pulp is for the time being wiped off the market. War risk insurance, scarcity of shipping space, and the general dangers of operating merchantmen in the war zones are likely to make movement of pulp carriers from Finland, Norway, and Sweden very precarious, to say the least. Thoroughly aroused to the possibilities of pulp scarcity, many converting mills have begun inquiring for pulp, and learned that it would have been well had they come to this decision some days, if not some weeks, ago. For pulp offerings have suddenly dwindled in size.

Much of this inquiry was in the nature of market sounding, an effort to learn what stocks are available at the ports, and what might reasonably be expected from Europe. New England sulphite mills reported an extra heavy rush of inquiry with some buying. At least two sulphite mills in this vicinity are operating on a six-day capacity week.

It looks as though $38-$40 will quickly become the accepted market for unbleached sulphite, that offerings of bleached sulphite below the $50 dock level will soon disappear, at least insofar as prime quality is concerned. Influence of kraft pulp scarcity resulting from European war is expected to help Southern mills with excess kraft capacity. Current quotation on domestic kraft range from $28 dock equivalent, upwards, with domestic bleached kraft quoted on the basis of $50-$55 north Atlantic ports.

It is understood that the railroads have applied to the Interstate Commerce Commission for exemption from fourth section liability under the Transportation Act, which would enable them to quote rates on import and inter-coastal pulp on a base rate of 22 cents to Ohio and Michigan.



"Please get out of my bathtub,"

said the man on page 27 to the Gnu from page 28

"I'D like to," the Gnu replied, "because I really belong on the next page with that animal article. I've just 'shown through'; that's all."

"Then please go back," said the man testily.

"I can't go back," said the Gnu, settling himself more comfortably. "Why don't you speak to the paper manufacturer?"

"About using Krebs Pigments?"

"Certainly. Any manufacturer ought to know that Krebs Pigments can easily take the 'show through' out of even the thinnest paper."

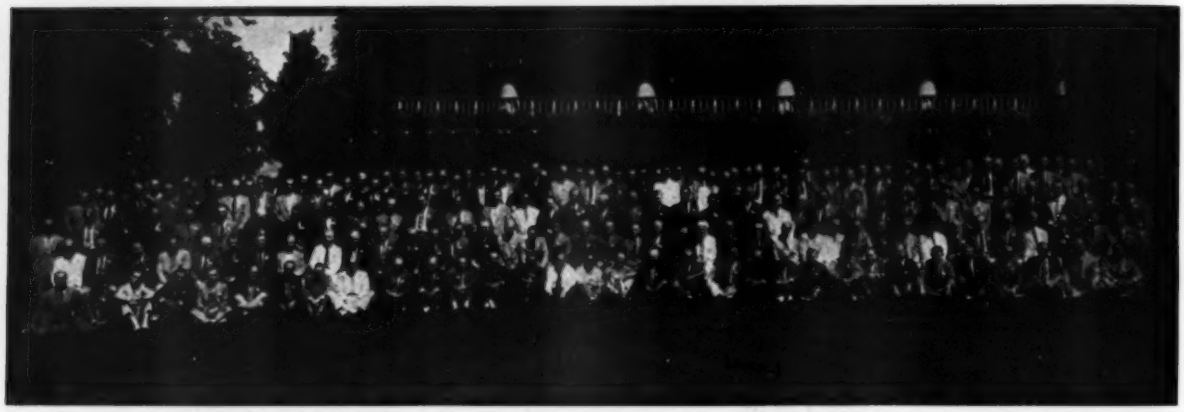
" 'Opacity' is the word, I believe," prompted the Man. "I wish you'd let me get on with my bath," he added plaintively.

"And speaking of cleanliness," the Gnu went on, "you ought to see the clean whiteness that Krebs Pigments give to paper. Brightness, too. It's positively amazing. And the Krebs people will gladly give any paper manufacturer all the technical information about pigments that he needs, free for the asking."

"Think of it!" said the Man.

"Do more than that," said the Gnu. *"Write* them!"

KREBS PIGMENT & COLOR CORP.
1007 Orange Street
Wilmington, Delaware



Hammermill agents gathered in front of the Kahkwa Country Club, Erie, Pa., during recent annual conference.

HAMMERMILL COMPANY'S TWENTY-EIGHTH CONFERENCE

▶▶▶ New manufacturing equipment and methods now in use at the Hammermill Paper Company were observed by Hammermill agents at first hand on August 23-25, on the occasion of the Twenty-eighth Annual Conference between Hammermill officials and the mill's agent-distributors. One hundred and fifteen merchants were present, representing houses located in all sections of the country.

As part of the three-day meeting, chartered buses picked up groups of visitors at the Kahkwa Country Club and transported them to the mill where guides pointed out interesting and new developments in Hammermill's constant program of mill improvement and modernization. This program has entailed the spending of several million dollars in the past few years.

Hammermill sales and advertising plans for the coming year took up a big share of the program of the two business sessions on the first two days. Norman W. Wilson, first vice president and general manager of Hammermill, opened the meetings with an address of welcome. He presided at both sessions.

Highlights of the meetings were talks by Representative Bruce Barton of New York and Dr. Julius Klein, former Assistant Secretary of Commerce. Mr. Barton gave an enlightening description of present European and domestic political situations. Dr. Klein spoke on today's business outlook.

Donald S. Leslie, vice president and assistant general manager of Hammermill, outlined the mill's efforts to keep its papers outstanding in quality and mentioned recent developments in the Hammermill program of keeping its equipment and manufacturing methods up to the minute. Harrison R. Baldwin, Hammermill vice president in charge of sales, showed sales charts and spoke about sales activities. Mr. Baldwin conducted the business of the meeting.

At the Friday session, A. Ellis Frampton, advertising manager and assistant general sales manager of Hammermill, showed displays of 1939 Hammermill magazine advertising and direct sampling material. Mr. Frampton pointed out the value of this advertising support to the merchants' salesmen's efforts. J. Fred Wuenschel, district sales manager for the Pacific coast, brought greetings from Grays Harbor Pulp and Paper Company, Hoquiam, Washington, and spoke of sales activities at that mill. G. P. Bothwell of Hammermill's sales department outlined special sales activities to be held this fall. Mr. E. V. Johnson, first vice president and general manager of the United States Envelope Company, Springfield, Massachusetts, reviewed sales trends of Hammermill bond envelopes and sales possibilities of this line.

▶▶▶ The business program of the two-day session was discussed and planned by the Agents Advisory Committee and the mill officials who met for luncheon and an afternoon meeting at Weigelia Lodge, the country home of Norman Wilson, on August 23. Members of the committee present were: E. P. Magel, chairman, Crescent Paper Company, Indianapolis; W. N. Stetson, Jr., Storrs and Bement Company, Boston; F. P. Leslie, John Leslie Paper Company, Minneapolis; J. P. Cunningham, Bradner Smith and Company, Chicago; H. T. Newell, Jackson Paper Company, Jackson, Mississippi; N. K. Woodward, Midwestern Paper Company, Kansas City; W. N. Schaefer, R. P. Andrews Paper Company, Washington, D. C.; H. F. Petrequin, Petrequin Paper Company, Cleveland, and L. A. Colton, Zellerbach Paper Company, San Francisco.

To replace members whose terms have expired, the agents elected the following men to the advisory committee: A. W. Green, Green and Low Paper Company, New York; George S. Clerk, Hudson Valley Paper Company, Albany, New York; T. H. Epes, Epes-Fitzgerald Paper Company, Richmond, Virginia. Mr. F. P. Leslie was elected chairman of the committee for the coming year.

New members elected to the Agents Advisory Committee are: H. G. Boyer, Caskie Paper Company, Charlotte, North Carolina, and Ormond Freile, Paper Merchants, Inc., Philadelphia.

The business sessions of the conference were held at the Kahkwa Club, Thursday and Friday mornings. The afternoons were given over to trips through Hammermill, golf, and other competitive games.

A beautiful Mexican automobile robe was presented for a drawing by mill men by Elwin Walker of Walker-Goilard-Plehn Company, New York, Hammermill export agents for Latin America. This was won by M. M. Davis.

The E. R. Behrend Golf Torphy was won by B. E. Reeves of the Alling and Cory Company, Rochester, New York. This makes the second time Mr. Reeves has won the trophy. The Roger Brooks Taft Memorial Trophy, a gold putter put up by the agents, was also won by Mr. Reeves.

Two sets of attractive prizes were offered for the sports events—one group put up by the mill for the merchants' men and the other put up by the merchants' men for competition by Hammermill's representatives.

ADVERTISING PAGES REMOVED

A Modern Theatre HAS FOUNDATION OF ONE Paper Mill AND WALLS OF ANOTHER

▸▸▸ THE NEWSPAPERS recently publicized the return of the famous Irene Castle to the stage in a theatre festival at the Paper Mill Playhouse, Millburn, New Jersey. Much was said about the dancer, but little about the name of the theatre. And since the words "paper mill" always mean something, the editor started an investigation to find out just what it meant in this case and how a theatre came to be named "Paper Mill Playhouse." What a story this little paragraph brought forth. We thought many of our readers would find it as interesting as we did. Here it is:

The Paper Mill Playhouse where Irene Castle scored her latest triumph is unique to the American stage. Built originally in 1820 as a paper mill, it is this that supplies its name. The name "Diamond Mill," by which it was known after the close of the Civil War, is most fitting, as stars of stage and screen now make scintillating history there. The Diamond Mill was built upon the foundation of a still earlier mill that was making paperboard when the States were yet English colonies. Some of this board provided covers for McGuffy readers.

The history of Millburn is rich in papermaking lore, and yet much of its early story was not then recorded—it has been handed down and years later put into the records. Both before and after the Revolutionary War, Millburn was a great papermaking center.

Perhaps nowhere is there a modern theatre with such a quaintness, and one that has been built on hallowed paper mill soil. The Paper Mill Playhouse illustrated above is built on foundations of a mill that was making board when the States were yet English colonies. The walls of the theatre that was built in 1934 are the same walls of the second mill built over the foundations of the first one.

The "Bill Smith" paper mill that was one of the early mills at Millburn, New Jersey. It was abandoned and demolished in the nineties.

At one time, more than a dozen different enterprises were to be found along its water courses, the last, but one, disappearing in 1894. That one remaining enterprise, the Fandango Mills, turning from water to steam, still goes on to maintain the tradition. The "Bill Smith" mill, illustrated on this page, was the last of an historic line. It was abandoned and finally demolished in the nineties.

History has lost the name of the founder of the first paper mill on the Playhouse site. It was partially destroyed by fire in the early 1800's, and in 1820 the property passed to Jonathan Parkhurst. He and his father Abraham rebuilt and carried it on until 1855, when it was purchased by the Diamond Mills Paper Company. During the Civil War, the company prospered and the plant was enlarged, but the depression which followed forced it to close.

Seldom does one hear such a story. Only 17 miles from New York City and its "Broadway," the Paper Mill

Playhouse stands in the center of a community bordered by beautiful estates, and this theatre has become a mecca for artists of the stage. The brook which once kept the old mill going, still murmurs at its door, but the surroundings are very modern.

In remodeling the old structure, the main building was retained intact, its brick walls as sound as when laid more than a century before. A part of this became the foyer with colonial fireplace and antique furnishings in keeping with the knotty pine walls and hewn beam ceiling.

The auditorium which seats 650 is within the old walls, while additions house the modern stage, dressing and work rooms and offices. A project for sound students of Stevens Institute of Technology, the acoustics have been carefully worked out, as have lighting and ventilation. The building is entirely air conditioned.

The town of Millburn is truly making history. During the Revolutionary War, the battle of Springfield was fought within its borders. Several pioneers in our industry found it an ideal spot to carry on the manufacture of paper and board. And now, in a beautiful modern theatre, built around the walls of a paper mill closed soon after the Civil War and resting on the foundation of its parent mill built 200 years ago, the artist who a generation ago danced her way to fame has returned to public life to introduce to the 1940's the charm and artistry of her dance interpretations.

◆

BEGIN PLANT MODERNIZATION AT AHDAWAGAM

First unit in an extensive construction program which will eventually replace its present frame manufacturing quarters has been begun by the Ahdawagam Paper Products Company in Wisconsin Rapids, Wisconsin. The company makes paper boxes and containers.

The new brick and steel building comprising the first unit of the program will measure 280 by 240 feet and will be located on company property south and west of the present buildings. The unit will house the finishing end of the corrugated and solid fiber departments, the shipping room, and the company's offices.

Of one-story, monitor-type factory construction, with concrete floors, the new unit's 280-ft. elevation will be on the Tenth Avenue side, with the 240-ft. length paralleling Fremont Street. Construction of the unit is expected to be completed by the first of the year.

The Ahdawagam Paper Products plant at Wisconsin Rapids, Wis., where work has begun on the first unit of a new modern, fire-proof building.

Designed on modern factory lines in lighting and ventilation, the building will provide additional floor space for the factory's operations. It will be the first building expansion at Ahdawagam since 1930, when the present brick unit was built.

Thomas Utegaard of the Consolidated Water Power & Paper Company is the engineer in charge of construction, and George Marcoux is the construction superintendent. The job is furnishing work for between 70 and 80 men during the estimated four-month building period.

Ahdawagam's frame buildings date back to 1891, when they were built for the Overbeck Brothers Furniture Company. The Overbeck firm occupied them until 1913, when the Ahdawagam Furniture Company was formed. That company became the Ahdawagam Paper Products Company in 1918. Its officers are George W. Mead, president; Frank R. Walsh, vice president and manager; and C. K. Crouse, secretary-treasurer.

◆

▸▸▸ THE BROWN COMPANY of Portland, Maine, reports no news from the RFC relative to the $10,000,000 loan on which their reorganization plan hinges. The company's business has shown definite improvement in recent weeks.

◆

NEW WAXES FOR PAPER TESTING

The Dennison Manufacturing Company, Framingham, Massachusetts, has recently developed a new series of standard paper testing waxes, designed to be used by paper manufacturers, coated paper manufacturers, printers, lithographers, and others concerned with the development, inspection, and control of paper for coating and printing purposes. Several paper mills have begun using paper testing waxes to test the strength of casein, as well as for determining the amount of casein binder needed to meet printing requirements.

WASHINGTON

Pulp Market Investigation Continues

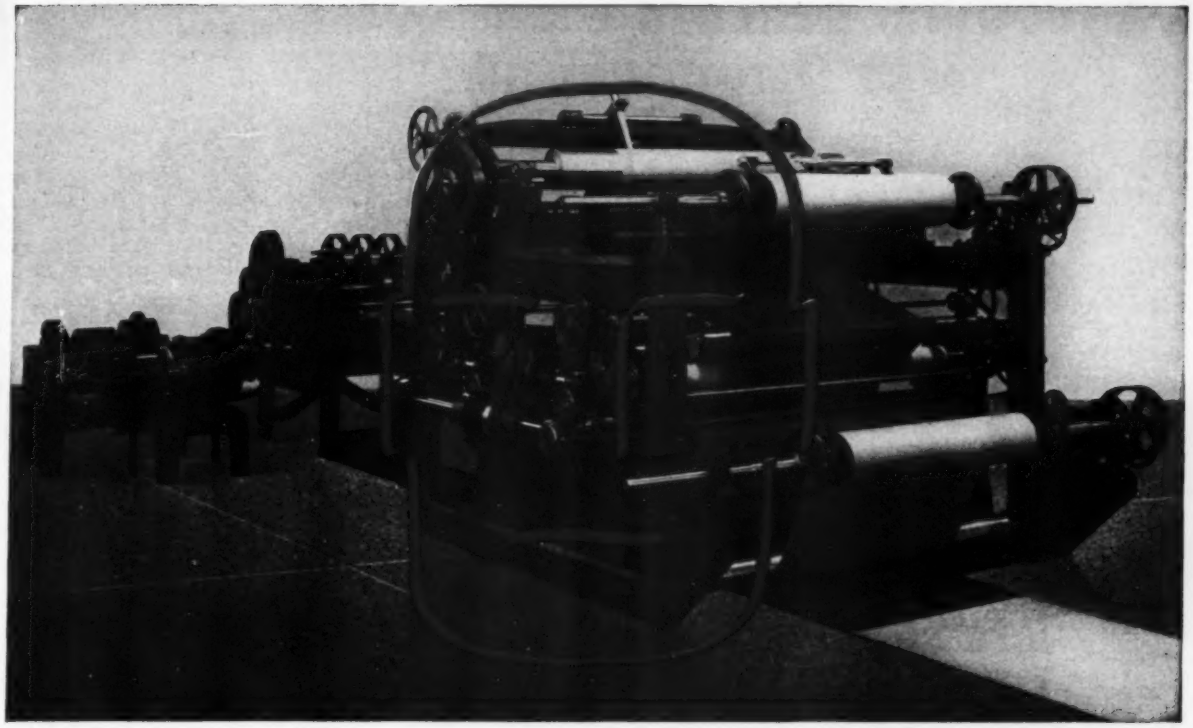
The United States Tariff Commission is proceeding with its investigation of the condition of the pulp markets by studies of both foreign and American developments, in accordance with the request of the United States Senate, and will have its report completed before April 15.

The so-called stream pollution bill, providing for a study of conditions in the nation's waterways, was not brought up for action at the recent session of Congress because it was believed that the temper of Congress was such that it would not authorize the expenditure of $1,000,000 for the proposed study, and the bill goes over for action until January.

The State Department has announced the proposed change of the existing Belgian reciprocal trade agreement, and the plan to make such an agreement with Argentina. On the list of articles slated for consideration for duty reduction in the Belgian agreement is fancy metal coated and velour paper, also several types of manufactures of paper, such as ribbon fly catchers and photographic papers. The Argentine agreement proposes a cut in the duty rate on casein, so essential an element in the production of coated paper.

The National Labor Relations Board has ordered the Fort Wayne Corrugated Paper Company, of Hartford City, Indiana, to bargain collectively with an American Federation of Labor paper union affiliate, and to reinstate a worker who was alleged to have been improperly dismissed.

The Interstate Commerce Commission has decided not to interfere with existing freight rates on shipments of paper and paper articles between the North and the South. A reasonable level, the Commission held, would be somewhat higher than that prevailing within the North, and lower than that prevailing within the South.



It *Thinks* . . .

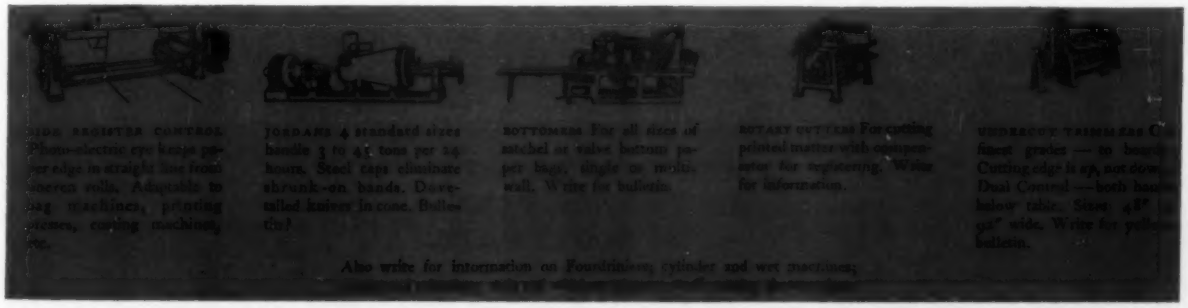
Smith & Winchester engineers adapted the photo-electric cell (electric eye) to S & W's improved straight line Paper Bag Tuber. Result: seam variations are held to 1/16″ plus or minus, regardless of unevenly wound or badly dished rolls.

From previously printed rolls the printing variations are held to 1/8″.

And the speed is 600 feet a minute, or more.

Without increasing the number of machines you have in use, or your space, *or* your man power—you can make production leap ahead by replacing present machines with this new development.

Complete data and quotations on S & W Paper Bag Tubers and Bottomers will be sent to you without obligation. Have your secretary drop us a note asking for it.



Also write for information on Foundrinier, cylinder and wet machines.

The SMITH & WINCHESTER *Manufacturing Company*

1828

ONE HUNDRED AND TEN YEARS OF ADVANCEMENT

PLANT AND OFFICES AT SOUTH WINDHAM, CONN.

VANCOUVER STREETS GET "LIQUORED UP"

THE Columbia River Paper Mills, Vancouver, Washington, is acting as Good Samaritan to that city by furnishing, free of charge, all the spent sulphite liquor required for use as a dust palliative on over 60 miles of unoiled streets. Most of Vancouver's streets have been surfaced for many years with fine pea gravel from the city-owned pit. This surfacing rapidly grinds up into fine material and as a result the roads are very dusty during the summer and fall. While the city has a program under way for the actual oiling of these roads, it probably will be many years before all can be so treated. In the meantime, it will be possible to allay the dust evil by sprinkling with liquor which provides a fairly hard bed and, of course, is far superior to water insofar as the dust is concerned.

The spent liquor has been found to be a natural binder for loose road surface material because of the pitch, rosin, etc., which it contains. While heavy rains will leech it out, one good application will keep Vancouver streets dustless for several months. When a street is to be oiled, two liquor applications are first made, as it has been found that the liquor acts as an excellent stabilizer for the road base preparatory to oiling.

A five-year agreement has just been signed between the mill and the city covering the free use of the liquor, which is ordinarily discharged into the Columbia River. City crews are working on a 7,000 gallon wooden tank for liquor storage at the mill. Any excess of road surfacing requirements will overflow from the tank into the mill sewer. The hook-up now is to take the liquor from only two of four digesters. The city will start out with one 800-gallon, wooden sprinkler tank made demountable so that it can be used on any of the city's trucks. When the city gets more sprinkler tank capacity, the other two digesters will be hooked in. As the digesters discharge every four hours, the liquor in the storage tank is always hot, in which condition it penetrates the road surfaces much better. A specially-made pump with stainless steel impeller and acid-resisting bronze casing has been ordered. This pump will be used to pump the liquor from the storage tank into the truck tank.

Use of the spent digester liquor for this purpose is not altogether new. They are using it at Camas, Washington, from the Crown Willamette mill. There is also a dust palliative made from liquor which is commercially available in concentrated form. The city of Vancouver, however, prefers to take it as it comes from the mill, especially as it can be had "free for nothing."

After an application, the street takes on a dark, brownish color in favorable contrast with the green lawns and foliage and for a day or two there is a slight vinegary odor.

The spent sulphite liquor also has uses as a weed-killer, it was brought out. J. L. Henderson, city engineer, pointed out that while this fact was in no way a determining factor in reaching the decision to apply liquor to unoiled street surfaces, it was realized that there are some places where roadside weeds are a great nuisance and it is the intention of the city to use some of the liquor for weed-killing purposes at a later date.

The total appropriation for the storage tank, the sprinkler tank and the pumping equipment was only $1,700. Charges for the operation of this equipment will probably be covered by some nominal charge per lot on abutting property. However, where the liquor is applied as a stabilizer to surfaces about to be oiled, the cost will be absorbed in the oiling operation cost.

◆

▶▶▶ THE PRODUCTION OF WOOD PULP for the open market increased substantially in 1937, the Forest Products Division of the Department of Commerce reported recently. According to Bureau of Census data production of wood pulp in the United States was 33 per cent higher than in 1935, representing a rise of from 4,925,669 tons to 6,572,918 tons.

◆

BEGIN NEW GROUP INSURANCE PLAN AT SCOTT PAPER

The Scott Paper Company, Chester, Pennsylvania, has recently put over $1,625,000 of new group insurance in force, in addition to the $1,926,000 of group insurance which has been in force through the Employees' Beneficial Association for the last twelve years. The new group insurance plan, which has been accepted by over 80 per cent of the eligible members of the organization, permits employees to purchase an amount of insurance based on weekly earnings.

The company pays the entire premium on the first $500 of insurance and substantial portion of the premium on the balance of the insurance to which the employee subscribes. The insurance ranges from a minimum of $500 to a maximum of $7,500. In addition, the company will pay the entire cost of the administration. The plan, which is on a payroll deduction basis, offers a convenient low cost means of providing increased protection for the families of employees and in event of death it specifies a common sense method of spreading the payment of the principal amount of insurance over a twenty-four month period.

CONVENTIONS AND COMING EVENTS

Sept. 18-20—National Paper Trade Association, Stevens Hotel, Chicago.

Sept. 20-22 — National Industrial Advertisers Association, Annual Conference, Hotel New Yorker, New York City.

Sept. 21—American Pulp & Paper Mill Superintendents Association, Fall Meeting, Michigan Division, Park American Hotel, Kalamazoo, Michigan.

Sept. 21—Canadian Technical Section, Joint Meeting with visiting members of the Technical Section of the Paper Makers' Association of Great Britain and Ireland, Windsor Hotel, Montreal.

Sept. 30—American Pulp & Paper Mill Superintendents Association, Connecticut Valley Division, Fall Meeting, Roger Smith Hotel, Holyoke, Massachusetts.

Oct. 6-7—American Pulp & Paper Mill Superintendents Association, Fall Meeting, Penn.—New Jersey Division, Ritz-Carlton Hotel, Atlantic City, New Jersey.

Oct. 12-13 — Packaging Institute, Inc., First Annual Meeting, Edgewater Beach Hotel, Chicago.

Oct. 13-14 — American Pulp and Paper Mill Superintendents Association, Fall Convention, Southeastern Division, Durham, North Carolina.

Oct. 16-20—National Safety Congress and Exposition, Atlantic City, New Jersey.

Oct. 27-28 — American Pulp and Paper Mill Superintendents Association, Southern Division, Roosevelt Hotel, New Orleans, Louisiana.

Dec. 4-9—Seventeenth Exposition of Chemical Industries, Grand Central Palace, New York City.

Jan. 22-26—Sixth Annual Heating and Ventilating Exposition, Lakeside Hall, Civic Center, Cleveland, Ohio.

IN COMPARISON with the cost of the power required to operate a paper machine and the expense of heating the driers, the price of a felt is a very small item in the total cost of drying paper. • • Experts estimate that a reduction of as little as 1% in the moisture content of the sheet delivered from the felt to the driers is sufficient to reduce the total felt cost from 25% to 50%. The least expensive felt is therefore the felt that delivers the most paper to the driers with the least moisture. • • Hamilton Felts do just that. Individually designed and woven with reference to the kind of paper they are to make and to the construction of the couch, presses and rubber rolls on which they are to run, Hamilton Felts not only last longer but they also remove more water. • • Whether judged in terms of productive hours or in terms of total drying costs, Hamilton Felts are the least expensive felts available to the paper industry.

From the thinnest tissue to the heaviest board, there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

Established 1858

SCUM IMPAIRS PAPER MILLS' WATER POWER

A heavy green scum of algae which forms on occasion over the north end of Lake Winnebago and on the Fox River has been unusually heavy this year and has interferred with water power, presenting a serious problem to Wisconsin paper mills. The Gilbert Paper Company, Menasha, was forced to shut down when filters on the plant intake were clogged by the thick mass which resembles split pea soup in appearance. Thousands of fish have been dying due to lack of oxygen and this, too, complicates the situation. An attempt to lessen the problem was made by raising the sluice gates, but no noticeable benefit was derived from this action.

◆

NEPCO PLANS ALGAE CONTROL

In order to have a pure, clean, supply of water for papermaking purposes, the Nekoosa-Edwards Paper Company of Port Edwards, Wisconsin, has undertaken a program of scientific algae control at Nepco Lake, from which the firm's water supply is taken. In charge are Dr. T. A. Pascoe, Nepco chemist, Chief Engineer E. P. Gleason, George Johnson, and Les Wellman. Dr. Bernard Domogalla of Madison, Wisconsin, one of the country's leading biologists who has done considerable work in algae and weed control, is acting in an advisory capacity.

Free floating algae has been the cause of serious trouble and has resulted in the closing of several paper mills in the middlewest.

◆

APPROVE WATER TOLL CHARGES FOR WIS. MILLS

Paper mills and utilities operating water power plants on the Chippewa and Flambeau rivers in northern Wisconsin must pay $107,394.93 to the Chippewa and Flambeau Improvement Company for use of water during the first six months of 1939, the Wisconsin Public Service Commission announced at Milwaukee, August 30, in approving the company's toll charges.

Wisconsin law requires the Improvement company to make semi-annual reports and recommendations to the commission for approval of the amount of tolls charged operators of water power plants on the two rivers. Individual toll charges are:

A prolonged siege of green scum on the Fox River in Wisconsin, lined the banks with hundreds of dead fish as shown above. The view below shows one of the paper mills where the scum clogged the intake filters.

Flambeau Paper Company, Park Falls, $11,499; Lake Superior District Power Company, Ashland, $9,460, and Ladysmith, $2,463; Cornell Wood Products Company, Cornell, $3,685; Northern States Power Company, Eau Claire, $67,151; and the Eau Claire Dells Improvement Company, Eau Claire, $12,137.

The Improvement company, with a series of dams and reservoirs, controls flowages of the two rivers for the best utilizing of the water for power.

◆

TO LOWER DUTY RATES ON PAPER

A development of vital importance to the paper industry is that the Department of State is preparing to revise downward existing duty rates on various kinds of paper, through the medium of reciprocal trade agreements. The first is a revision of the existing agreement with Belgium in which it is proposed to revise the rates of duty on fancy metal coated, and velour papers, vegetable parchment, and some manufactures of paper. Also, it is announced that there will be a revision of the agreements with Finland, France, Switzerland and Holland, all of which carry paper items. The hearings and conclusion of agreements are being expedited, and Washington gossip is that the Administration has decided to get further duty rates reduced before Congress, in its present recalcitrant mood, can stop this policy of the State Department. If the agreements are concluded before January, Congress is faced with international agreements already in effect, and can do little to prevent the State Department's campaign to increase imports of foreign goods in competition with domestic manufactures.

◆

HEARST A PROBLEM TO CANADIAN NEWSPRINT IND.

According to the *Financial Times*, of Montreal, the Canadian newsprint industry is now confronted with one of the most trying situations it has ever had to face. It has discovered, says the paper, that the Hearst publications in the United States owe Canadian newsprint companies over $10,000,000. Hints of this large indebtedness have come from time to time during the past year in mentions made in the annual reports of various companies of sums owing from the Hearst interests, the hints being mainly in auditor's notes explaining the impossibility of placing exact valuations on the collateral put upon the chance of converting it into cash.

The new management of the Hearst companies is centering on making monthly payments on overdue accounts; and in the meantime the Canadian companies are forced to acknowledge that the papers must be kept going and on that account they cannot put a stop to shipments.

◆

MAINE'S PEELING OPERATIONS ON EXTENSIVE SCALE

Shortly after the seasonal exemption for pulpwood peeling operations in the northeastern states was conceded by Wage Hour Administrator Elmer Andrews, pulpwood peeling on the most extensive scale in several years began in Maine. On August 30 it was announced from Ashland, Maine, center of peeling operations for Great Northern, that "bark has stuck" and that the work was nearly over. With the advent of the first days of September bark no longer removes easily from the spruce logs and sticks tightly as the days shorten. Labor was plentiful and contractors report that they have been able to turn out their quota.

MILES of SMILES!

The most contented railroad passenger is the one made most comfortable. Timken Roller Bearings effect comfort for the traveling public such as it never before experienced.

The most contented railroad executive is the one who sees operating costs decline—volume increase. Timken Bearings effect economies, maintain schedules, eliminate hot boxes and old time troubles as never before. This is definitely proven by the highly efficient performance of Timken Roller Bearings, now on most of America's newest streamliners and latest locomotives.

That means Miles of Smiles for everyone.

The soundest dollar for dollar investment the American railroads can make is to equip all rolling stock, old and new—passenger cars, locomotives and freights—with Timken Bearings. Costs come down tremendously—volume shoots up—vastly improved all around operation is the gratifying result. Miles of Smiles for everyone!

NOTICE

Look for the trademark TIMKEN on every bearing, whether buying new equipment, or replacing a Timken Bearing in your automobile, or truck, industrial or farm machinery. That trademark is your assurance of quality.

TIMKEN
RAILWAY ROLLER BEARINGS

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

This advertisement appears in The Saturday Evening Post for September 9th. Miles of Smiles for every manufacturer and user of Timken Bearing Equipped products.

A NEW PAPER MARKETING CORP. FORMED

Announcement was made recently of the organization of "Tested Papers of America, Inc.," a marketing corporation for household and supply papers under a national promotion program.

"Tested Papers of America, Inc.," was recently formed in Columbus, Ohio, by a group of 200 paper merchants who desire to market merchandise under firm labels and names. The corporation plans to license manufacturers to produce such items as toilet papers, tissues, household towels and napkins for over-the-counter trade and, in addition, kraft paper, bags and towels for industries in the supply trade. Initial news states that the organization is already represented in more than 70 per cent of the United States.

Frank P. Vaughan

The corporation was conceived by R. W. Miller, vice president of the Central Ohio Paper Company, Columbus, who was elected chairman of the board of the new organization. Frank P. Vaughan was elected president and general manager (See Personals), resigning as general manager of the Bay West Paper Company, Green Bay, Wisconsin. E. P. Magel of the Crescent Paper Company, Indianapolis, was elected treasurer, and John Wesley, formerly vice president and sales manager of the Rhinelander Paper Company, was elected secretary.

According to a statement issued by President Vaughan, the reason for organizing the independent paper merchants of America was to "improve the situation in our industry which is suffering from uncontrolled, profitless merchandising abuses." General headquarters of the new company will be located in Chicago where a testing laboratory will be established and running checks will be made to certify quality, and where research on new products will be conducted.

R. W. Miller

BRIEFS

▶▶▶ THE NORTHEASTERN TIMBER SALVAGE ADMINISTRATION, the Forestry Department's agency which is handling the purchase and disposal of blown-down timber from the September (1938) hurricane in New England, has actually acquired title to 11,131 cords of spruce, fir, poplar, and hardwood pulpwood. The administration has contracted with timberland owners for the purchase of 127,929 cords of pulpwood which should be delivered to storage depots in larger volume, now that the peeling season has ended.

◆

▶▶▶ THE FOREST SERVICE of the Department of Agriculture has announced that the receipts from the sale of forest products from the 158 national forests during the fiscal year ending June 30, 1939, amounted to $4,870,516, a sum $261,662 more than last year but considerably below the 1930 record of $6,751,553.

◆

▶▶▶ THE INTERNATIONAL PAPER COMPANY has completed arrangements with the Chase National Bank of the City of New York, the First National Bank of Boston and the Bankers Trust Company, for refunding both issues of its secured sinking fund notes due in 1940 and 1941, respectively, by a new issue to the same banks of $13,000,000 secured notes.

▶▶▶ THE PRESENT OUTPUT of the Great Lakes Paper Company's mill at Fort William will be maintained at its present level, according to A. D. Cobban, Toronto, vice president of the company. The mill is operated at about 64 to 65 per cent of capacity at the present time, with a possibility of a slight increase due to seasonal conditions in the fall.

◆

▶▶▶ ABOUT A HALF MILLION DOLLARS will be spent on extensions to the plant of the Bathurst Power and Paper Company, Bathurst, N. B., this year, according to an announcement by A. J. Nesbitt, president of Nesbitt Thomson and Company.

◆

▶▶▶ THE CROWN WILLAMETTE PAPER COMPANY, Camas, Washington, recently completed the drilling of a well to secure a source of cold water for acid making. The well, which produces some 2,000,000 gallons a day, is ideal for acid making because of the fact that the water's temperature ranges from 47 to 50 degrees and sulphur dioxide is more soluble in cold water.

▶▶▶ A MACHINE FOR THE MAKING OF FIBER CONTAINERS for milk and other fluids has just been completed in the shops of the General Machinery Corporation, Hamilton, Ohio. According to an item in the *Chicago Sunday Tribune*, the machine is reputedly the only one made which makes, fills, and seals fiber containers in one continuous operation.

◆

▶▶▶ AS THIS ISSUE goes to press, a report states that the paper warehouse of the Fox River Paper Company, Crescentville, Ohio, was destroyed by fire September 6. The first report stated the loss was estimated at $20,000. The fire could not be extinguished because of a lack of water, and it was thought the thousands of bales of paper would burn for about a week. Because of the intense heat, firemen could not determine the origin of the fire.

◆

▶▶▶ PAPER MILL EXECUTIVES from the Wisconsin Valley area gathered at Wausau, Wisconsin, on July 28 for consideration of the schedule of assessments of water power users on the Wisconsin River during the first half of 1939, resulting in the customary tolls by the Wisconsin Valley Improvement Company. Recommendations were heard as to the amount of water which it will be advisable and safe to release during the remainder of the summer.

Editorial

ADVERTISING PAGES REMOVED

★ ★ ★

PAPER IS A BUY . . . WAR OR NO WAR

▸▸▸ CURRENT NEWS of all the various activities in this country and throughout the world all points to a larger demand for paper in the next four months at materially better prices.

For the past ten years, business has had to contend with the worst major depression the world has ever known. In addition, this country has had seven years of the most reckless and profligate spending administration on record. And finally, during the past twelve months, the horizon has been clouded with an omnious and constantly increasing shadow of another World War.

Any one of the above catastrophies would have been enough in itself to cause unprecedented loss of confidence, contraction of values, and curtailment of business activity, but when the people of business in America get all three of these disasters concurrently and cumulously, climaxing in another European welter and wreckage, it is just too much to expect business to remain in the state of torpidity which has been maintained, especially during the past year.

Immediately the depression became manifest, ten years ago, business began its contraction. Inventories, which were huge at the time, were slated for liquidation. All expansion of industrial processes was curtailed. Business volume shrank and hand-to-mouth buying became the order of the day. In the spring of 1933, business hit bottom.

The Roosevelt administration, swept into power with promises of curtailment of Government spending, reduction of taxes, balancing of the budget and National Industrial Recovery, did a 100 day upturn and expansion. Then, the administration began an about-face with reform taking the place of recovery and regimentation of agriculture and industry instead of co-operation. Business slumped. A fight between the forces of beaurocracy and democracy began. The next turn of events began with the attack upon the Supreme Court in February, 1937. That date marked the beginning of the end of the New Deal. The 1938 elections proved the vast change in public opinion that had taken place, and then came the famous speech-on-the-bridge-at-noon-time in Chicago in September, 1937, wherein our Chief of State threatened to quarantine every recalcitrant nation on earth. That speech precipitated the Roosevelt depression, and on top of that came the "Munich Putsch" in September, 1938, since which date, this country, as well as the whole world, has been under the baneful shadow of another World War which, at this writing, although incredible of belief, seems certain to eventuate.

Ten years of business contraction, inventory liquidation, curtailment of industrial expansion and hand-to-mouth buying. What's been the result in this country? The greatest shortage of industrial commodities this country ever knew.

We have twelve million more people today than ten years ago and a general business volume of scarcely 75 per cent of the 1926 volume. Now, comes crashing to our ears, as we sit penning this message of the month to our readers, the announcement from the radio of the assaults of the Nazi forces upon the Polish borders.

This country needs industrial goods, including paper, as it never needed them before, and never had such a paucity of inventory as at this moment. No wonder that the markets on wheat went soaring today and even more astounding to the listeners, the surge upward of stocks of all basic commodity corporations of from one to twelve points. The significance of that happening is that the knowing ones see that great volumes of basic goods are to be in demand. Paper and pulp prices are sure to rise quickly. The closing of the Baltic ports from whence 25 per cent of our pulp supplies come, will produce drastic increases in value.

The increased demand will come from increased consumption. Increased consumption of paper by 10 to 15 per cent means a near shortage. Pulp and paper are good investments, especially at today's prices, which have been below cost. The quick buyer will make the long profit.

Paper is a buy, war or no war.

◆

MARKETING RESEARCH

▸▸▸ THE U. S. DEPARTMENT OF COMMERCE recently released a publication designated as Domestic Commerce Series No. 107 and entitled, *Industrial Market Data Handbook of the United States*. This book is such an outstanding contribution to the field so accurately covered by its title that no industrial marketing executive should be without it. It is designed especially to aid sales and advertising executives in estimating sizes and locations of markets, and the potential value of these markets.

So impressive is this volume that a study of its contents brought to mind rather emphatically the real need for more marketing research by the pulp and paper industry as a whole as well as by individual pulp and paper mills in particular. Nothing is more important to the future success of individual mill organizations than a better understanding of potential markets. The industry has made great strides in recent years technologically, but can it be said that similar advances have been made by the industry in its marketing procedure? In general, at least, the answer most decidedly would have to be "No."

More and more, leaders of the industry are crying for a better understanding of the use requirements of paper and for the development of new uses for paper. Both of these subjects could be better understood if more marketing research data on the field were available. The only way to get this information is to set up the right kind of organization to get it and then to allow such an organization to function as freely as possible.

The possibilties for expansion of production operations and for increased profits from operations, resulting from basic studies of this kind, are great, and no mill is too large or too small not to consider them.

CURRENT THOUGHT

WORLD WAR II

WILLIAM SIBLEY

▸▸▸ THIS IS WRITTEN Sunday morning, August 27. . . . It is probably very silly of me to approach such a vital subject as the impending war, since perhaps before this manuscript even gets to the compositor it will be out of date deplorably. Laughably wrong in its conclusions. But I'm going to fool you. What I set forth here is *not* my opinion (since I have almost none at all). It is merely a recording of the opinions of others, ranging from bartenders to presidents of good-sized corporations.

Last night, having worked late, I stopped in at the Normandy House and imbibed one of "Tommy Smith's" delicious mint juleps. (At least *that* part of my conference with Tommy was right.) But our conversation drifted, quite naturally, to the European crisis. Tommy wanted to know "what crisis?" Then, when I registered surprise, he assured me with considerable finality, quite characteristic of Tommy, that "there will be no war." In explanation he went on to say that "England and France will give no inch of compromise. They are adamant. They won't back down. . . . but Hitler will. And so—there is no cause to consider this a crisis for Europe, since there will be no war."

Well! I'm glad Tommy settled the European difficulty that way, and with such apparent ease. Leaving his sanctorium of intemperance I made my way to a restaurant called the "Ranch." Very good place to eat. In front of that eating palace I met "Gus" (I never can remember his last name) the proprietor. Seeing me, he hailed me with the question "Where are you going?" I assured him that I was in search of a good dinner and that I would be glad to have him recommend a restaurant. As might have been expected, he avowed as to how *his* place was pretty good. Whereupon I told him that I would partake of his nourishing food if he would give me the solution to the impending war in Europe. "What war?" he queried. And then, when I registered the second astonishment of the evening he assured me, with certainty, that "There isn't going to be any war. Two weeks ago I knew that England and France would stand pat on their assurance to help Poland and at the same time I knew that Hitler would, this time, back down. There isn't going to be any war—at least not for some time."

Of course, I wanted to know how he knew that "two weeks ago." But he wouldn't tell me. His source of information was apparently under-cover and should be kept without benefit of indentification. But, without possible collusion, Tommy and Gus voiced identical opinions within the space of thirty minutes.

▸▸▸ Having eaten, I repaired to the residential hotel where I live. Stopping at the desk for my mail (chiefly bills) I hesitated long enough to get into conversation with the night clerk. And he told me, in confidence of course, that the English, in spite of all their seeming stumbling statesmanship, had "engineered" during the past four or six weeks, the treaty-agreement between Germany and Russia. They, according to the desk clerk, had set up their smoke screen of attempted negotiating between England and Russia—all the while encouraging and abetting the formation of some sort of compact between Germany and Russia. Why? For the purpose of stymying Communism—of further killing the expanding radius of communistic influence. It seems, according to the desk clerk, that England has successfully stamped out the Communistic party in France. England had helped, infinitely, in the correction of communistic tendencies in Italy. Now, with the arrangement of a compact between the hated "enemies" (Germany and Russia) England had left, quite flat, the Communistic party in Spain, to say nothing of the United States. According to him, after the German Bund and the Communists had staged battles in Madison Square Garden (and elsewhere), after the editors of communistic papers had reviled anything Nazi or Fascist, here (thanks to England, according to the desk cleark) they were—Nazi and Communist, in the same bed.

Well, it really *was* gratifying to have so many things explained, all in one evening.

▸▸▸ Getting up to my little two-for-a-nickel apartment I was scarcely divested of coat and hat when the 'phone rang. And down in the lobby were two friends of mine, one of them a rather learned geographer. . . . Of course, they should come up and I'd pour them a Scotch and soda. They did. And, as might be expected, our conversation turned to the focal interest of the world, Europe. Whereupon my learned friend quoted Nazi Rhetorician E. Banse, as saying, very tersely: "War is something of a geographical phenomenon. It is absolutely tied to the surface of the earth; never departing from those positions which are favorable to one side, or unfavorable to the other." . . . I doubt if any general, since the days of Ulysses, more succinctly voiced the intimate relationship between battle and trrain. (However, here I am voicing my own personal opinion [in the last sentence] and I promised to give you a digest of a typical cross-section of the American public.) . . . So getting back to my friends, they went on to say:

"The only thing that may slightly change the course of historical events is the invention of the airplane, which because it knows no mountainous limitations and does not need to ferry rivers where bridges have been blown up adds a third dimension to the picture of war. That mechanical invention, plus the scientific development of radio, makes Hannibal, Napoleon, Bismarck, and even Pershing of no value when predicting the future."

"But regardless of what happens—when it does happen, we'll get into the mess, that is certain. Because when the various nations of Europe finally get into a squabble—then someday some airplane is going to be flying over Paris, London, Berlin, Warsaw or wherenot, and the pilot aiming his death bombs at some delicatessen, church or department store is going to miss his mark—and hit the American Embassy. Then we are going to get mad. Later, some submarine will blow into eternity an American liner—and then we are going to get awfully mad. Still later, as innocent standbys to some street fight, Mr. and Mrs. Fortune and Miss Fortune, are going to be riddled by machine gun bullets, and then the fat will be in the fire. After that, we'll find out, finally, the truth of Sherman's classic remark. . . . A nice little World War II might even be the means for a third term for Roosevelt."

ADVERTISING PAGES REMOVED

HEMICELLULOSES in the Pulp Industry

LOUIS ELSBERG WISE, Professor Emeritus
New York State College of Forestry

IT was in 1891 that Schultze and his co-workers *(1)* first coined the word "hemicellulose." They had discovered that of all the water-insoluble polysaccharides in the cell walls of plants, one alone remained practically unattacked by hot dilute acids. This resistant cell wall substance was cellulose. All other cell-wall polysaccharides appeared to hydrolyze with the formation of mixtures of a relatively small variety of simple sugars. These less resistant compounds, Schultze christened the "hemicelluloses." Depending on their nature, the latter were usually more or less soluble in dilute aqueous NaOH solutions.

The term "hemicellulose" implies that these substances are generically related to cellulose. This proved to be an oversimplification. If we define these polysaccharidic substances in the general terms of insolubility in water, solubility in alkali, and hydrolysis by acids, there appear to be two general types. One type is very closely related to and associated with natural cellulose, and probably resembles cellulose in its chemical configuration. The other type is certainly not associated with the cellulose and shows marked chemical differences from that compound *(2)*. Hawley and Norman *(3)* have differentiated between these two classes and their classification is the best one that we have today, for it depends not only on the physical but also on the chemical properties of these substances. The first class contains the *cellulosans,* substances actually occurring in the cellulose framework. The second class contains the *polyuronides,* the encrusting substances. A third group may also occur unassociated with the cellulose. This contains the *polyoses,* the existence of which is really still in doubt. It depends on how much reliance can be placed on the older experimental data.

On acid hydrolysis, the cellulosans yield only simple sugars, largely xylose or mannose or mixtures of such sugars. On hydrolysis, the polyuronides give simple sugars *and also uronic acids*. It is the presence of these uronic acids which serves to separate the first class from the second. It is also these uronic acids (unidentified in the days of Schultze) which show the limitations of the term "hemicellulose".

Dr. A. G. Norman, then biochemist at the Rothamsted Experimental Station, and now Professor at Iowa State College, has made a critical study of the hemicelluloses *(4)*. He has discussed their differentiation preparation, fractionation, constitution, classification, properties, etc. He has written a very important, very stimulating and suggestive book on the subject. Perhaps no one man has done more by his own work to clarify this obscure field, and yet he states quite frankly: "The chemistry of the hemicelluloses remains to be written." The writer of any article on the hemicelluloses must find himself in Norman's debt, and must of necessity draw on the critical evaluations given by him. So the reader who wants a deeper insight into the field than any that can be given herein, is referred to Dr. Norman's monograph.

▸▸▸ Quite naturally, the question arises: "Of what possible interest is all this to the pulp and paper industry?" In answer, no writer need be on the defensive. When it is recalled that all mechanical pulp contains besides cellulose and lignin, large amounts of the cellulosans and polyuronides; that chemical pulps all contain cellulosans besides cellulose, and that even alpha pulps contain cellulosans, it is evident that the hemicelluloses are omnipresent in the paper industry, and are often undesirables in the Cellophane and rayon industries. The properties of the pulp are affected by their presence, as are those of the finished sheet of paper. The course of pulping seems to be correlated quite definitely with the removal of the polyuronides as well as of lignin. Waste liquors contain sugars, fermentable and unfermentable, that find their origin in the hemicelluloses. All this is sufficient reason for focusing attention on an important class of compounds, the study of which is attended by unusual difficulties, and the true nature of which is, in most cases, unknown.

For the time being, leaving out of the discussion the component lignin, we may say that cold alkali removes from plant tissue largely the polyuronides, and that hot alkali probably removes most, though not all, of the cellulosans. The cellulose itself remains largely unaffected. Hydrolysis of the polyuronides sometimes gives an intermediate albionic acid, before the final sugar and uronic acid are obtained. (These albionic acids represent condensation products of one uronic acid molecule and a monosaccharide with the loss of a molecule of water.)

Hemicelluloses are practically without reducing action on Fehling solution and are not acidic *(5)*. This reputed nonacidity appears strange in the case of polyuronides, which have uronic acid linkages. Many of the hemicelluloses when dissolved by alkali may be reprecipitated by Fehling solution or other copper salts, forming copper complexes that are readily decomposed by the addition of acids. Other heavy metal salts also cause precipitation. Certain hemicelluloses may be precipitated from their alkaline solutions by acids, often at a definite hydrogen ion concentration. The precipitate may be dehydrated by alcohol, washed with ether, and dried to white or nearly white powders. On the other hand, the same precipitates form horny masses, if the water is not removed prior to drying. When dissolved in 1-2 per cent NaOH, most hemicelluloses are levorotatory. It is interesting to note that while, in their original form, in the cell walls of plants, the hemicelluloses are all insoluble in water, some of them form colloidal opalescent solutions with water after cautious isolation.

Norman uses the term "natural cellulose" or "plant cellulose" as synonyms in contradistinction to "true" cellulose or what in its purest form is cotton cellulose. All natural celluloses contain *true* cellulose *plus* the *cellulosans*. This would be the case in chemical pulp or Cross and Bevan cellulose. The chemical constitution and molecular magnitudes

have been discussed in a previous article in this journal *(6)*. We are very uncertain about the mean molecular weight of even pure cellulose. This would be even more difficult to determine in the case of a *true* cellulose isolated, let us say, from pulp. And the mean molecular weight of the accompanying cellulosans would be even more dubious. However, the chain length of certain xylans is probably much lower than is that of the accompanying true cellulose—and may actually be of a lower order of magnitude *(7)*.

▶▶▶ What appears to be an excellent method for obtaining the *total hemicellulose content plus the cellulose* content is the "holocellulose" procedure of Van Beckum and Ritter *(8)* in which extracted wood is treated alternately with chlorine and 3 per cent alcoholic ethanolamine solution. Another satisfactory method which also gives essentially all the polysaccharides of the cell wall (the skeletal substances, so-called) is that of Erich Schmidt, Tang, and Jandebeur *(9)*. Here chlorine dioxide is used and the chain lengths of the molecules (at least in the case of cellulose) gauging from the degree of polymerization as studied by Staudinger and Juresch *(10)* are probably very little changed. Of course, whether or not minor (oxidative) changes take place in the hemicelluloses in either of these procedures is still a moot question. From a quantitative standpoint they must be slight, for separate lignin determinations give results which, when added to the per cent of holocellulose, account for very nearly 100 per cent of the substance of extracted wood. In any event, holocellulose, as far as we can judge, gives us the sum total of cellulose, cellulosans and polyuronides. Later we shall have occasion to refer to this mixture of "skeletal" substances again.

Since the cellulosans are tenaciously retained by the true cellulose, they must be considered an integral part of the cellulose aggregate. For example, in the analysis of a wood, by the chlorination method of Cross and Bevan (i. e., a series of chlorinations followed in each case by sodium sulphite treatments) the polyuronides as well as the lignin are removed, but the cellulosans remain in the residue, which for the want of a better name we have termed "Cross and Bevan cellulose." Similarly carefully delignified and bleached wood pulps contain appreciable amounts of cellulosans.

What are these cellulosans? In the case of hardwoods, as the following table by Norman shows, they are largely xylans. When softwoods are analyzed, it is apparent that the xylan content drops and that mannans are also present. In fact in softwoods, the total cellulosan content is usually 14-16 per cent, while in the hardwoods it often approaches 25 per cent. The seed hair of the cotton plant contains no cellulosans, but the cotton plant as a whole (i. e., the stalk) contains appreciable amounts of cellulosan. In strong commercial fibers, like ramie, jute and flax, the cellulosan content is always low. Straw pulps contain 25 per cent or more xylan.

The question now arises, What is the significance to the pulp maker of those hemicelluloses which have been termed the polyuronides? There is often a change in solubility of hemicelluloses after they have been extracted with alkali. This may become apparent through their solubility in water, and is an indication that they do not occur "free" in all cases. In fact, they may be chemically bound to the lignin of the wood or straw. These "bound" substances are presumably the polyuronides and their importance in chemical pulping becomes obvious at once. On delignification the polyuronides are also removed. The relative ease of methylation of lignin isolated from spruce, as compared with the difficulty in methylation when the original wood is used (without pre-treatment with acid) indicates that the isolated lignin contains "free" groups that were originally "bound" in the wood. A hypothesis has been formulated that the hydroxyl groups in the lignin can not be methylated until after hydrolysis has taken place. The lignin in the cell-wall presumably is linked to some carbohydrate, possibly the hemicellulose. And prior to isolation it seems to be stabilized in the "enolic" form. Such stabilization would be accounted for if there were actually a chemical combination between lignin and carbohydrate in the raw material. According to this concept, lignin when isolated contains "ketonic" groups in place of the "enolic" ones *(11)*.

▶▶▶ There is some suggestive evidence for this hypothesis, in data secured in the chlorination of wood. Take the case of maple. The lignin as it occurs in the wood itself takes up more chlorine than does the lignin after isolation. This indicates that *in situ,* prior to isolation, there are more unsaturated groups than in the isolated product. This would harmonize with the idea that lignin in wood is in the enolic form. However, it certainly is not even indirect proof—for carbohydrates liberated by the hydrolytic action during chlorination, might conceivably consume certain amounts of chlorine, due to oxidation, unless the conditions are extremely mild, and the polysaccharides are largely protected. Recently Hägglund *(12)* has shown that when a lignin-containing pulp is chlorinated, in practice, the low chlorine concentration in the pulp suspension is consumed rapidly and it is assumed that the chain lengths of the carbohydrates are not appreciably changed. Even with varying conditions of pulping for a given wood, the resulting per cent bleached pulp (and alpha cellulose) remain constant. Hägglund also assumes the hypothesis that lignin is chemically bound to hemicelluloses, in the cell walls of partially delignified sulphite or sulphate pulps. The higher the lignin content of a given pulp (according to Hägglund's assumption) the higher the percentage of hemicelluloses that enter solution in alkali. This solution in alkali seems correlated with their mean molecular magnitude. On the other hand, there is somewhat more conclusive evidence that lignin is associated very closely with polyuronide hemicelluloses. Norman and Jenkins *(13)* and later Norman and Shrikhande *(14)* found that chlorination in the Cross and Bevan method is just as essential for the removal of these polyuronides as it is for the removal of lignin. Practically speaking, the former remain largely unaffected by sodium sulphite, unless chlorination precedes such treatment. Norman's careful studies have shown that on protracted sulphite treatment alone, an appreciable amount of the lignin is removed from wheat straw. Under these conditions a small amount of polyuronide material is also extracted. On the other hand, as stated above, the classical Cross and Bevan chlorination removes both lignin and polyuronides almost completely. With fir wood, relatively little of the lignin or polyuronide hemicellulose is removed by sodium sulphite alone, whereas the Cross and Bevan method removes them both. Another interesting point was brought out. While sodium sulphite was essential for practically complete removal of lignin, after chlorination, *water alone* served to remove nearly all of the polyuronides. Norman points out that this might form a new method for preparing hemicelluloses, and for stndying them. The present writer is somewhat doubtful about this, unless the chlorination is very carefully controlled, so as to obviate the oxidation of the carbohydrate material.

Further indirect evidence for the existence of a compound or complex between lignin and the hemicelluloses is offered by Sands and Nutter *(15)*, who worked with mesquite wood. Their data indicate that, when lignin is removed by chlorination followed by cold 10 per cent NH_4OH, the remain-

ing hemicelluloses are readily soluble in *cold* aqueous NaOH. On the other hand, NaOH solutions did not effect the complete removal of hemicelluloses from mesquite wood.

Only last year Jayme and Wettstein *(16)* approached the problem of the polysaccharides in wood somewhat differently, and, while their interpretation is not identical with that of Norman, there is a similarity in hypothesis. A summary of this work has already been published in this journal *(17)*. However, the results demand brief recapitulation here. Jayme and Wettstein used Asplund pulp (mechanical pulp made by grinding coniferous wood at 10 atmospheres and 180 deg. C.). The finer stock, separated by a Voith centrifugal screen, was subjected to carefully controlled chlorination followed by a mild alkaline treatment. The data may be interpreted as follows: Over 44 per cent of the pulp is true cellulose. There is a transition zone of polysaccharides associated with the cellulose of about 12-13 per cent. (This would correspond to Norman's cellulosans.) Then there is a polysaccharide lignin fraction corresponding to 33 per cent. Finally Jayme refers to what he considers "pure lignin" which amounts to about 9-10 per cent of the entire pulp. The fact that the strongest pulp sheets still retained 4-6 per cent of the lignin is of practical interest. However, for purposes of the present article, we want to point out that it is the 33 per cent lignin-polysaccharide complex which is of marked significance. This would include Norman's polyuronides, and would be removed in the production of chemical pulp.

▶▶▶ The reader should be warned that there are data in the literature (not always based on sound experiment) which are not in accord with what has been stated above. Some authors claim that bleached chemical pulps contain at least small amounts of polyuronides. One persistent but none-too-convincing author is Otto Wurz, whose data with those of his collaborator *(18)* require verification and amplification as well. He states that *pectins* (polyuronides) are present in pulps, and that those sulphite pulps which are highest in uronic acids best lend themselves to parchmentization. These are said to contain more than 2 per cent uronic acid (calculated as galacturonic acid). When the uronic acid content is low (0.77 to 0.94 per cent) very poor parchmentizability is shown. It seems difficult to accept this without much more thorough experimental work, although we must admit that the idea is suggestive. To the writer it appears very doubtful whether pectin or the polyuronides are present in chemical pulp.

The relationship between lignin and the hemicelluloses (and of pectin) are of interest. It is known from the work of Harlow *(19)* that the lignin of the secondary layer of wood is removed by mild chlorination *before* the lignin of the middle lamella is appreciably attacked. The middle lamella of wood, which must be removed before wood can be converted into pulp, is an excellent field for chemical exploration. Bailey *(20)* separated a part of the middle lamella of Douglas fir wood by a microtechnique. He then determined the lignin in this preparation by microanalysis. It amounted to about 71 per cent of the sample. Later *(21)* he found that over 14 per cent pentosans were also present. This indicates that the middle lamella may contain some hemicelluloses, and there is reason to believe that a small part of it may be pectin. However the "pectin" content referred back to the *entire* wood must be very low, and this casts further doubts on the meagre results of Wurz *(18)*.

During the gradual development of mature wood (such as is used in pulp making) it is at least possible that polyuronide hemicelluloses containing pentose groups are converted into lignin. But other hypotheses are not excluded, and up to the present no theory for lignin formation has received sufficient experimental confirmation to warrant its universal acceptance or discussion in this present article.

Xylan and Mannan Present in "Natural Celluloses." (Norman)

Cellulose from the following source	Xylan (per cent)	Mannan (per cent)
Oat straw	24.5	....
Barley straw	23.5	....
Wheat straw	28.6	....
Oak (English)	25.6	....
Beech	24.0	....
Douglas fir	5.5	10.1
Silver fir	7.3	7.0
Redwood	11.6	4.8
Sisal	24.7	....
Manila hemp	18.9	....
Coconut fiber (coir)	24.2	....
Pita grass	13.4	....
Jute	16.2	....
Ramie fiber	1.8	....
Italian hemp	1.9	....
Flax	2.5	....

Let us turn now to a few of the more practical aspects.

Whether or not hemicelluloses in pulp have an effect on the rate of beating has received attention during the past few years. In this connection, Klingstedt *(22)* has demonstrated that the rate of hydration, and the resulting strength of sulphite pulp is definitely correlated with its solubility in aqueous NaOH (in concentrations ranging from 5-17.5 per cent). The higher the percentage of alkali soluble material, the greater is the rate of beating. This, at first blush, might indicate that hemicelluloses (which are alkali soluble) are instrumental in hastening hydration. But Klingstedt, who has shown that the pentosan content of a pulp has no marked effect on either its maximum strength or on the beating time, warns against any such general assumption. This seeming paradox deserves further investigation.

Carl G. Schwalbe *(23)* showed that mechanical pulp was much more sensitive to heat, direct sunlight, and to ozonization, than the original wood from which it was prepared. Was this due to the removal of certain carbohydrates during the grinding process; possibly degradation products of the hemicelluloses? The question remains unanswered at present. In any event, the yellowing of groundwood during exposure to light *seems* to be associated with the loss of certain carbohydrates during grinding. Newsprint, treated with glucose, retains its color better than does the untreated material.

Recently Hägglund and Larsson *(24)* made a study of the chemistry of spruce knots. After freeing from resins, the knotwood contained 33 per cent lignin, while the normal

wood contained 28.6 per cent. In the knotwood the pentosan content was 6.6 per cent while in normal wood it was 5.4 per cent; and the respective mannan contents were 9.2 and 10.8 per cent. In other words, the total cellulosan content did not show great differences. On the other hand, there were marked changes in the cellulose contents. Knotwood contained 31.2 per cent and normal wood 48.3 per cent. This is exceedingly interesting since paper prepared from the pulp of knotwood alone had no appreciable strength, and no commercial value. It is possible that this is due to the lowered cellulose-cellulosan ratio, but it is more probable that the mean chain length of the polysaccharides in the pulp of knotwood is lower than that in normal spruce wood. But this is purely speculative on the part of the writer.

▶▶▶ Perhaps one of the most recent developments involving the hemicelluloses was carried out recently in Germany in the preparation of fibrous "holocellulose." This is the work of Jayme, Storch, Keiler, and Schwab *(25)*, and seems to be in line with a feverish attempt on the part of German chemists to find methods of utilizing beechwood. A marked modification of the "holocellulose" method was used. Beechwood shavings were submitted to vacuum chlorination followed by treatment with sufficient NaOH or $Ca(OH)_2$ to render the solution just alkaline. The yields obtained were 73-75 per cent of a holocellulose retaining 0.3-3.0 per cent lignin depending on the experimental conditions. A somewhat modified treatment of beechwood gave holocellulose still retaining 1 to 6 per cent lignin, and in the latter case the yields were over 83 per cent. This material, beaten in an experimental Jokro-mill gave pulp sheets, the mechanical properties of which are certainly encouraging. Using a modified holocellulose procedure with spruce, the authors also report very favorable results. The pulp yield was 40 to 50 per cent higher than that obtained by the usual methods, when these were carried out to the same lignin content as that obtaining in the holocellulose. Strength tests on spruce holocellulose are such that large scale investigations are in order. The results reported here represent laboratory experiments and must therefore be considered orientating. As stated above, the holocellulose represents the cellulose, cellulosans, as well as most of the polyuronides of the original wood. In other words, the hemicellulose here forms a very appreciable part of the pulp content.

In their studies of beechwood, using various methods for the partial delignification and of holocellulose isolation, Müller and Bartholme *(26)* successfully disprove the "nonexistence" of lignin in this wood at least. This would also follow from the researches of Jayme and his colleagues *(25)*. The reader may recall that in the past years Hilpert and his co-workers have questioned the existence of what most of us consider the substitute giving rise to the most extensive organic waste products of modern industry—lignin.

In this brief article, no attempt has been made to uncover more than a few practical cases in which the hemicelluloses impinge on pulp and paper manufacture. Nor has the literature been covered comprehensively. If what has been written is suggestive or stimulates further work, or if it encourages the reading of Dr. Norman's work, the present writer is satisfied.

◆

Literature Cited

1) Ber. *24*, 2285 (1891), etc.
2) For a discussion of the chemical configuration of cellulose, cf. Wise. *The Paper Ind. and Paper World* (July 1938) 413-15.
3) Hawley and Norman. *Ind. Eng. Chem.* 24, 1190 (1932).
4) Norman. Biochemistry of Cellulose, Polyuronides, Lignin, etc. (1937).
5) Norman, loc cit. p. 58.
6) Wise. *The Paper Industry and Paper World,* (July 1938), 413-6.
7) Norman, loc cit. p. 23.
8) *Paper Trade J.* 104, No. 19, 4 (1937).
9) Schmidt, Tang, and Jandebeur. *Cellulosechem.* 12, 201, (1931).
10) Staudinger and Juresch. *Papier-Fabr.* 35, No. 49, 459-71 (1937).
11) Harris, Sherrard, and Mitchell. *J. Am. Chem.* Soc. (1934) *56,* 889.
12) Hägglund. *Finnish Timber J.* (1938) No. 15a, 4-12.
13) Norman and Jenkins. *Biochem. J.* (1933), 27, 818.
14) Norman and Shrikhande, *Biochem. J.* (1935) 29, 2259.
15) Sands and Nutter. *J. Biol. Chem.* (1935), 110, 17.
16) Jayme and Wettstein. *Papier-Fabr.* 36, Tech.-Wiss. Tl. 519-31 (1938).
17) *The Paper Industry and Paper World.* (March 1939) 1336.
18) Wurz and Swoboda. *Papier-Fabr.* 37, Tech.-Wiss. Tl. 125-7 (1939).
19) Harlow, New York State College of Forestry. Tech. Publ. 24, (1933).
20) Bailey. *Ind. Eng. Chem.* Anal. Ed. (1936), *8,* 52.
21) Bailey. *Ind. Eng. Chem.* Anal. Ed. (1936), *8,* 389.
22) Klingstedt. *Svensk-Pappers-Tidn.* 40, 412-6 (1937).
23) Schwalbe. *Papier-Fabr.* (Fest u Auslandsheft) Tech.-Tl. 243-7 (1937).
24) Hägglund and Larsson. *Papier-Fabr.* 35, Tech.-Tl. 475-81 (1937).
25) Jayme, Storch, Keiler, and Schwab. *Papier-Fabr.* 37, Tech.-Wiss. Tl. 57-9 (1939).
26) Müller and Bartholme. *Papier-Fabr.* 37, 103-5 (1939).

NATURAL AND ACCELERATED AGING OF PAPERS

▶▶▶ THROUGH TESTS of some old book papers the National Bureau of Standards has found a further good correlation between the effects of natural aging of papers and the accelerated aging of them by heating.

The Bureau tests the stability of papers by heating them for 72 hours at 100 deg. C. and then testing for loss of folding endurance and for deterioration of the fiber as indicated by tests for cellulosic components. Fibers of record papers which withstand this test satisfactorily are characterized by a high content of alpha cellulose and a low copper number; both indicative of cellulosic purity. The cellulose of high-grade fibers may have over 90 per cent of alpha cellulose and a copper number of less than 0.5, and unless the paper contains too much acid or other deteriorative components, it loses little or none of its folding endurance under the heat test. When such paper loses a considerable amount of its folding endurance on heating, the alpha cellulose generally decreases and the copper number increases.

That some of the old book papers had deteriorated greatly from their original condition is evidenced by their brittleness. They cracked apart when creased only a few times and they could not have withstood the bookbinding operations in this condition. Furthermore, they apparently were composed of linen fiber and the Bureau has examined many very old papers of this nature which apparently were in practically as good condition as when first made. The cellulose of the brittle book papers was found to have an average of only 53 per cent alpha cellulose, and an average copper number of 5.4. The rest of the papers were in much better condition and they had an average alpha cellulose content of 79 per cent and an average copper number of 3.4. As new linen paper generally has the chemical characteristics mentioned above for highgrade papers, apparently on deterioration of the old papers the same changes in these characteristics took place as occur when papers become brittle under the heat test.

The deterioration of the papers was probably caused by storage in a damp place as there were evidences of mold which is known to be deteriorative to papers. The papers ranged in age from about 125 to 250 years.

Specific Gravity - Temperature Relationships for Alum Solutions

H. N. BOGART[1] **and D. S. DAVIS**[2]
Wayne University

ALUM solutions figure prominently in many beater furnishes and are widely used in water treatment in the paper and other industries; yet a recent survey of the literature has revealed the lack of reliable and usable data covering the relationships between specific gravity, temperature, and concentration. Gerlach *(1)* and Kellerud *(2)* have studied fairly wide ranges of concentration but have confined their attention to temperatures of 15 deg. and 18 deg. C., respectively. Reuss *(3)* presented specific gravity data for temperatures between 15 and 45 deg. C., over satisfactory concentration ranges for pure aluminum sulphate and for commercial alum but the results are somewhat erratic.

In each case the information is merely in tabular form and is well adapted to immediate use. The purposes of the present investigation were (a) to determine the specific gravities of a number of alum solutions of known concentrations over the temperature range of 10 to 35 deg. C., (b) to correlate these data by suitable, closely fitting empirical equations and (c) to present an alignment chart enabling rapid calculation of concentration when specific gravity and temperature are known.

Experimental Method

Thirteen solutions varying in concentration from about 0.1 to about 2.2 pounds per gallon were prepared, using commercial iron-free alum containing 55.2 per cent anhydrous $Al_2(SO_4)_3$. A portion of each, in turn, was placed in a carefully standardized pycnometer of about 30 ml. capacity, equipped with a combination ground-glass stopper and thermometer. The pycnometer and contents were cooled below 10 deg. C., and allowed to warm slowly to 35 deg. C. Weighings were made at 5-degree intervals and specific gravities relative to water at 4 deg. C. were calculated.

The data are presented in Table 1 while Figure 1 shows the specific gravity—temperature lines of constant concentration to be slightly concave toward the origin.

Correlation of Data

For each solution a linear relationship exists between the specific gravity, δ, and a certain function of the Centigrade temperature, t, according to the equation

$$\delta = a\,[t + 0.00032(t - 10)^3] + b$$

For concentrations, C, below 1.1 pounds per gallon

$$a = -0.0000594\,C - 0.0001963$$
$$\text{and } b = 0.06535\,C + 1.0025$$

while for concentrations above 1.1 pounds per gallon

$$a = -0.0000324\,C - 0.0002261$$
$$\text{and } b = 0.06185\,C + 1.0063$$

Use of the Nomograph

Figure 2, a line co-ordinate chart based upon the above equations, enables rapid and convenient calculation of the concentration when the specific gravity and temperature are known, enhancing the utility of the experimental data. The

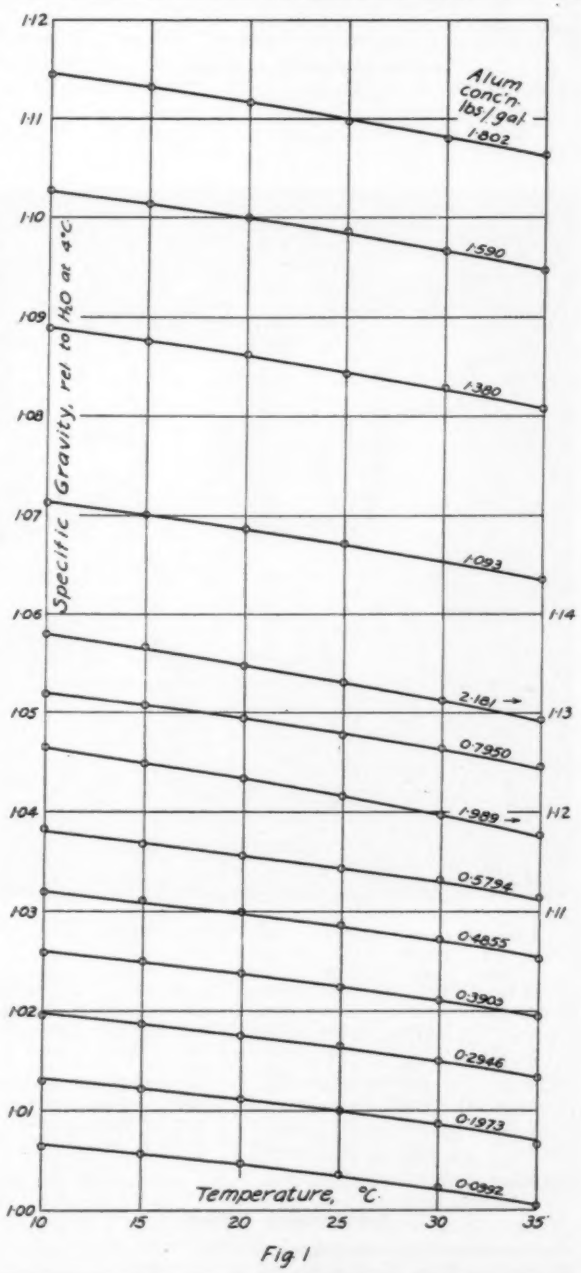


Fig 1

(1) Graduate student; (2) Chemical Engineering Department.

broken line on the chart indicates that an alum solution at a temperature of 25 deg. C., (77 deg. Fahr.), with a specific gravity of 1.1030 (relative to water at 4 deg. C.) has a concentration of 1.68 pounds of 55.2 per cent anhydrous alum per gallon. The horizontal scales at the top of the chart effect conversion between pounds per gallon and percentage concentration according to the expression

$$\text{percentage conc'n.} = \frac{100\,C}{8.33\,\delta'}$$

where δ' is the specific gravity of the same solution at 20 deg. C., relative to water at 4 deg. C.

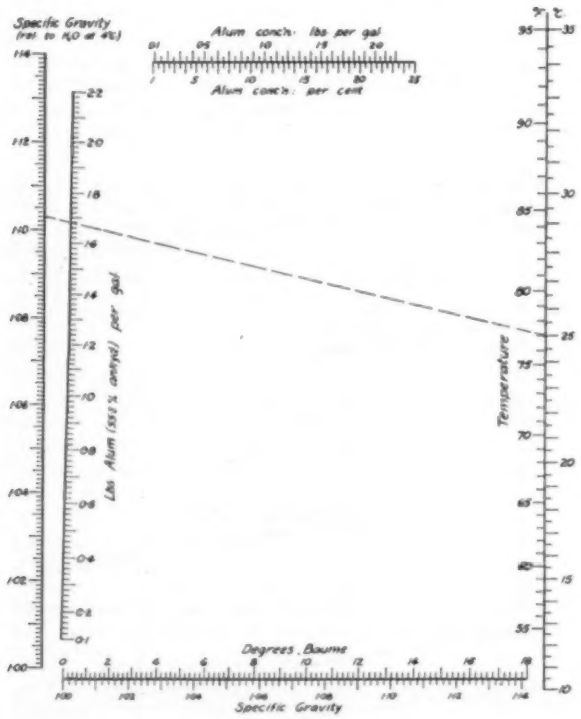


Fig 2

Table 1

Conc'n. lb./gal.	Specific Gravities (relative to water at 4 deg. C.) at					
	10 deg. C.	15 deg. C.	20 deg. C.	25 deg. C.	30 deg. C.	35 deg. C.
0.0992	1.0065	1.0057	1.0047	1.0035	1.0022	1.0005
0.1973	1.0131	1.0122	1.0113	1.0101	1.0087	1.0066
0.2946	1.0197	1.0188	1.0177	1.0165	1.0150	1.0132
0.3905	1.0259	1.0250	1.0238	1.0226	1.0211	1.0194
0.4855	1.0320	1.0311	1.0299	1.0286	1.0272	1.0253
0.5794	1.0383	1.0368	1.0356	1.0343	1.0332	1.0314
0.7950	1.0519	1.0508	1.0494	1.0477	1.0464	1.0446
1.093	1.0713	1.0701	1.0687	1.0672	.....	1.0636
1.380	1.0889	1.0876	1.0862	1.0843	1.0828	1.0808
1.390	1.1028	1.1014	1.1000	1.0986	1.0966	1.0948
1.802	1.1145	1.1133	1.1117	1.1098	1.1081	1.1064
1.989	1.1265	1.1253	1.1234	1.1216	1.1198	1.1177
2.181	1.1379	1.1366	1.1347	1.1331	1.1312	1.1293

Literature Cited

1) Gerlach, Zeit. für anal. *Chemie*, 28, 493 (1889).
2) Kellerud, *Paper Trade J.*, 92, No. 21, 47 (1931).
3) Reuss, *Berichte der Deutschen Chemischen Gesellschaft*, 17, 2888 (1884).

Table 2

t Deg. C.	∂	Lb. per gal. known	Lb. per gal. chart	Per cent dev.
15	1.0122	0.1973	0.194	—1.7
20	1.0113	0.1973	0.198	0.4
25	1.0101	0.1973	0.197	—0.2
30	1.0087	0.1973	0.198	0.4
15	1.0508	0.7950	0.796	0.1
20	1.0494	0.7950	0.795	0.0
25	1.0477	0.7950	0.788	—0.9
30	1.0464	0.7950	0.794	—0.1
15	1.1132	1.802	1.799	—0.2
20	1.1117	1.802	1.798	—0.2
25	1.1098	1.802	1.796	—0.3
30	1.1081	1.802	1.798	—0.2
15	1.0311	0.4155	0.490	0.9
20	1.0299	0.4155	0.491	1.1
25	1.0286	0.4155	0.490	0.9
30	1.0272	0.4155	0.490	0.9
15	1.0876	1.380	1.379	—0.1
20	1.0862	1.380	1.380	0.0
25	1.0843	1.380	1.376	—0.3
30	1.0828	1.380	1.380	0.0
15	1.1366	2.181	2.180	—0.1
20	1.1347	2.181	2.174	—0.3
25	1.1331	2.181	2.176	—0.2
30	1.1312	2.181	2.176	—0.2
Average deviation.....				0.4

In the present instance 1.68 pounds per gallon is seen to be equivalent to 18.25 per cent of 55.2 per cent anhydrous alum. The horizontal scales at the bottom of the chart enable conversion between degrees Baumé (Bé) and specific gravity according to the equation

$$\delta = \frac{145}{145 - \text{Bé}}$$

Further practice in the use of the chart may be attained by checking through the following illustration: An alum solution testing 8.2 deg. Bé (specific gravity = 1.060) at 22.5 deg. C. (72.5 deg. F.) contains 0.970 pounds of 55.2 per cent anhydrous alum per gallon, constituting an 11-per cent solution.

Table 2 shows the nature of the agreement between calculated and experimental values, indicating that the chart yields concentrations deviating, on the average, about 0.4 per cent from the observed data.

Table 3 shows the present work to be in close agreement with the data of Gerlach and of Kellerud but to differ somewhat from the values reported by Reuss.

Table 3

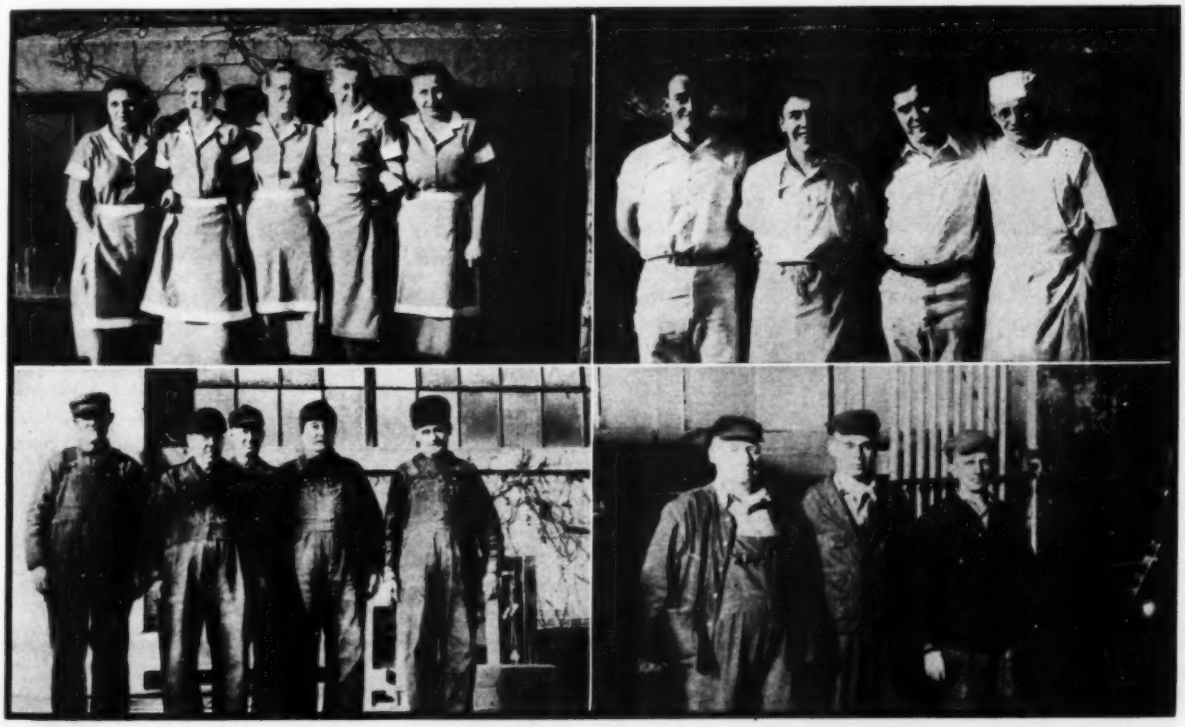
t Deg. C.	∂	Rel. H_2O at (deg. C.)	Per cent 55.2% Alum Fig. 2	Per cent 55.2% Alum Earlier Data	Per cent dev.	Earlier Data of
15	1.0535	15	9.40	9.31	1.0	Gerlach
15	1.1105	15	18.77	18.62	0.8	"
18	1.0100	18	1.78	1.81	—1.7	Kellerud
18	1.0621	18	10.87	10.87	0.0	"
18	1.1280	18	21.86	21.75	0 5	"
15	1.0600	4	10.62	9.60	10.6	Reuss (a)
25	1.0950	4	16.99	16.82	1.0	"
35	1.1300	4	23.29	24.31	—4.2	"
15	1.0600	4	10.62	9.49	11.9	Reuss (b)
25	1.0950	4	16.99	15.97	6.4	"
35	1.1300	4	23.29	22.97	1.4	"

(a) Pure $Al_2(SO_4)_3$; (b) Commercial alum.

Employee Uniforms

L. JOHN PINKERTON

▸▸▸ THE POLICY OF PROVIDING suitable working uniform clothing for employees was considered several years ago by the Gilbert Paper Company of Menasha, Wisconsin. After being convinced that many benefits were possible by so doing, and that the original cost of uniforming the working force would be offset partly by an increase in efficiency, improvement in personal cleanliness, and by a more wholesome attitude toward the mill's safety work, action was taken to go ahead with the plan.



Showing types of uniforms selected by different groups of employees.

Blue bib overalls, blue shirts and caps, and blue overall jackets made up the uniform selected for maintenance men, engineers, firemen, electricians, clean-up crews, and warehousemen. The selection for all female employees consisted of medium blue uniform dresses, trimmed in white, blue and white aprons of the same material, and head bands with matching colors. White overall trousers, short-sleeve white shirts, and white overseas caps were chosen for all men in the operating departments; while white duck trousers and long-sleeve white shirts were adopted for mill foremen and the laboratory staff.

The company then purchased assorted sizes of each of these garments and issued two complete uniform outfits in the correct size to each employee without cost.

A uniform card was made up to record each employee's size and the date the uniform was received. The individual employee signed his or her respective uniform record card, thus acknowledging receipt of the garments, promising to keep them clean, and to wear one of them on the job at all times.

The individual employee is responsible for the laundering and the mending of uniforms issued to him or to her. When a uniform becomes badly worn, it is brought to the office for examination, and, if necessary, the worn garment is replaced with a new one without expense to the employee. By keeping a careful record of each employee's uniforms and requiring the return of an old one before issuing a new one to replace it, any natural abuse of the service is eliminated.

The results obtained from this practice of furnishing working uniforms without cost to employees are, of course, partly intangible. Nevertheless, since the plan was put into effect, certain tangible advantages have been so apparent that the company feels justified in continuing it. Some of those advantages are:

1) Improvement in personal neatness of mill employees.
2) Reduction of accidents.
3) Much personal jealousy between employees has been eliminated because of uniformity of apparel.
4) The maintenance and management of uniforms has created among the employees a co-operative feeling, and has fostered a better understanding between them and the management.
5) Mill visitors and guests cannot help but be impressed by the appearance of the uniformed force; it has drawn comments of appreciation from most of them.

A Visit to the Dard Hunter Paper Museum

HARRISON ELLIOTT

THE long hoped for installation of the Dard Hunter Collection of Paperiana as a public institution has been accomplished at last. It has remained for the Massachusetts Institute of Technology to give to this most extensive collection a worthy and sumptuous setting. Since last December, Dard Hunter and Dard, Jr., have been at work there installing the more than two thousand items in a most artistic and easily comprehended form.

On entering the Museum, one first sees an exhibit of somewhat antiquated equipment from an English paper mill which typifies the European method of making paper with a hand mold. It is the process of papermaking which prevailed, in principle, for the eighteen centuries prior to the invention of the papermaking machine; and it is with this phase of papermaking that the Dard Hunter collection is mostly concerned. This English equipment was only recently discarded by Hodgkinson & Company from its Wookey Hole Mill, Wells, Somerset, a mill that for many years has specialized in fine hand-made papers.

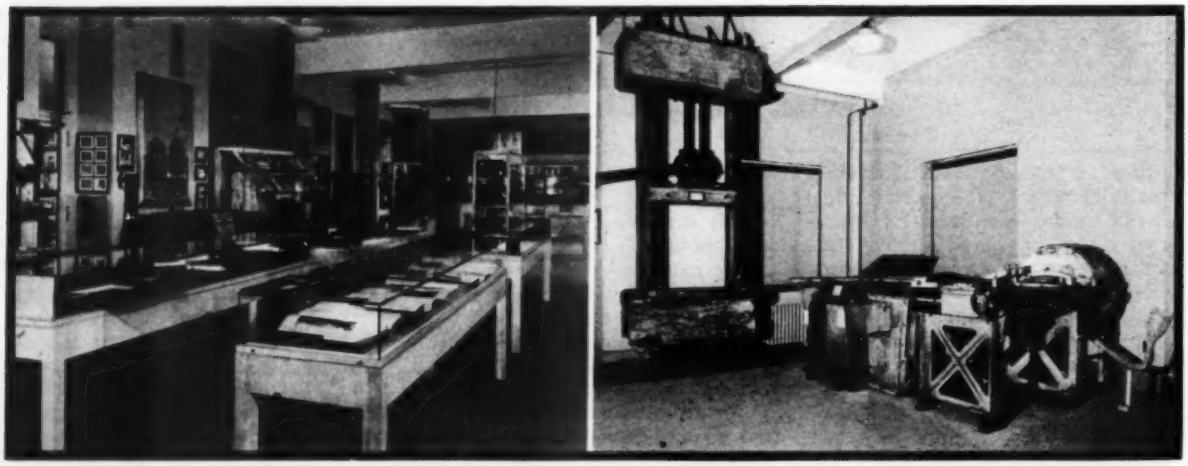
Although not in operation, this equipment supplemented by photographs enables one to visualize the interesting process of making paper with a hand mold and to appreciate the difficult task of the vatman in making sheet after sheet of beautiful and endureing paper. The equipment consists of a lifter for conveying the pulp to a knotter, a knotter which strains and renders the fibers free from inseparable clumps, a large lead-lined vat, a couching stand, and an old screw pack press weighing two tons, in which newly formed paper was first subjected to pressing to remove the moisture. The screw of the press was turned by man power applied to a long wooden pole or lever.

Where it has been impossible to install equipment of working size and to give it the atmosphere of its own environment, small models have been made by the Hunters, father and son. These models realistically reproduced in color to simulate the aging by operation and weathering are works of art and they are replicas in miniature to show the actual working principles of the equipment. One model, complete in every detail, is of a primitive mill at Yen Thai, Tonkin, Indo-China. Another model is a complete small scale representation of a stamping mill at Arach, Kashmir, North India.

Approach to Paper

The approach to paper is indicated by such sheet forms of vegetable origin as papyrus, tapa and the so-called "rice paper." The papyrus exhibit has ancient specimens dating back to 200 B. C. There are stalks showing the flowering and sliced stalks demonstrating the process of laminating to form the finished sheet. Though paper derives its name from papyrus, papyrus is not a true paper. The exhibit clearly shows that there is no disintegration of the fiber in the stalk; and, in the finished sheet, the fiber retains its natural position.

Intermediate between papyrus and paper is tapa. It is very tastefully displayed with examples from remote places in the South Sea Islands. Tapa is frequently called cloth, but it more nearly approaches paper, as tapa is derived from the inner bark of the paper mulberry, the chief papermaking material in the Orient. This close relationship to paper is justified by the "feel" of tapa, which is very paper-like in substance. But the natural position of the fibers in tapa is very little changed by a beating operation which simply spreads the bark, somewhat similar to gold beating. This beating is effected with clubs, the bark being laid on a firm base and moistened. The tapa exhibit is replete with beating clubs of various designs and with many interesting photographs of natives making tapa and applying the curious primitive designs. The tapa specimens on display are a fascinating study in primitive design



Left—General view of some of the exhibits in Paper Museum. Right—Vat, lifting-box, knotter, and press brought to America from Somersetshire, England, especially for the Paper Museum.

and lend an exotic and picturesque touch and make an interesting record of a dying industry.

"Rice paper" is a term tossed about rather carelessly. Generally, it is recognized as a curious, white, pithy substance in sheet form. A closer application of the term is to paper made from rice stalks, an inferior sort of paper from the Orient. The rice paper exhibit consists of packages of pure white fragile sheets derived from the pith of *Fatsia papyrifera,* a plant indigenous to the Island of Formosa. The Chinese use it as a "canvas" for dainty and colorful paintings, many of which are displayed. The substance, known to commerce in this country as "rice-pith paper," is used in making artificial flowers. It toughens when wet and dyed, and in that state is readily worked into flower forms. Though not a true paper, it is closely related. The exhibit includes old prints of great rarity showing the process of preparing the material in sheet form.

Out of China

China, the country that gave to the world the idea of papermaking, is represented by specimens of early papers made in the infancy of the industry. There are some fragments of a sheet which was made during the Han Dynasty 25—220 A. D. Other specimens made from the inner bark of the paper mulberry date from the sixth and seventh centuries, and speak well for the lasting qualities of that raw material. The use of bamboo can be traced back to a time between the years, 960-1126 by a specimen on view.

The Chinese are past masters in the use of color and design in decorating paper, and beautiful specimens of wood block printed papers taken from palaces grace the walls of the Museum. In many instances, the original wood blocks are also exhibited, and it is possible to duplicate exactly, many ancient designs and exotic decorative motifs. Another important and interesting part of this section of the Museum is the display of Chinese ceremonial papers, curious in design and usage. This is a subject upon which Dard Hunter has written an entire book—one of his recent works.

Korea, the intermediary between China and Japan in the spread of the knowledge of papermaking, has a space devoted to showing papers made in that country which marked the first use of color in papermaking. The exhibit also reminds us of another first by the Koreans, envelopes dating back to 1810, before they were adopted by the Western world. There are also photographs of Korean papermaking in its primitive and most interesting form, papermaking molds peculiar to Korea, and a grouping of material of historical and technical significance.

Windows of the Museum are arranged to show various watermarks dating from the beginning of the art to the finest light-and-shade papermarks of the present day.

The Japanese Exhibit

From the standpoint of beauty of texture, color and fiber effects, the most wonderful papers made today are the handmade product of the Japanese. This fact is borne out by the colorful exhibit of modern Japanese handmade papers which for richness and variety of color effects cannot be matched. The silk-like inner bark of the paper mulberry coupled with the artistry of the Japanese is responsible for this excellence which has long defied imitation.

The hand tools of the Japanese, particularly their molds, are marvels of ingenuity in their making and call for a high degree of skill in their use. There is one mold from which a sheet of paper 29x67 inches can be made. This mold is a wall decoration. Beneath it is an entire vat equipment so beautifully made as to resemble a bit of furniture. The more primitive implements are also shown, such as hand beater clubs and mallets for reducing barks to a fibrous state. There, too, are photographs which indicate that women perform a large part of the labor in Japanese papermaking, and they make the scene more picturesque.

From India

The Indian collection is most extensive, and it was to India that Dard Hunter made his last and probably his most difficult papermaking pilgrimage. During his visit in India, Mr. Hunter collected sufficient implements and specimens of paper and photographed so many papermaking scenes that the India exhibit affords as comprehensive a picture of the old industry in that country as it is possible to obtain.

Watermarks

The display of watermarks covers a period of 650 years. It includes some examples of watermarking which appeared in the infancy of the art, some simple geometrical designs, some beautiful tonal effects, elaborate in detail, and some faithful portraits of eminent personages.

The interesting process of producing light-and-shade watermark portraits is illustrated by the original etching in wax and the dies made from this wax matrix and the screen with the final impression of the design. Original dies are shown of the work

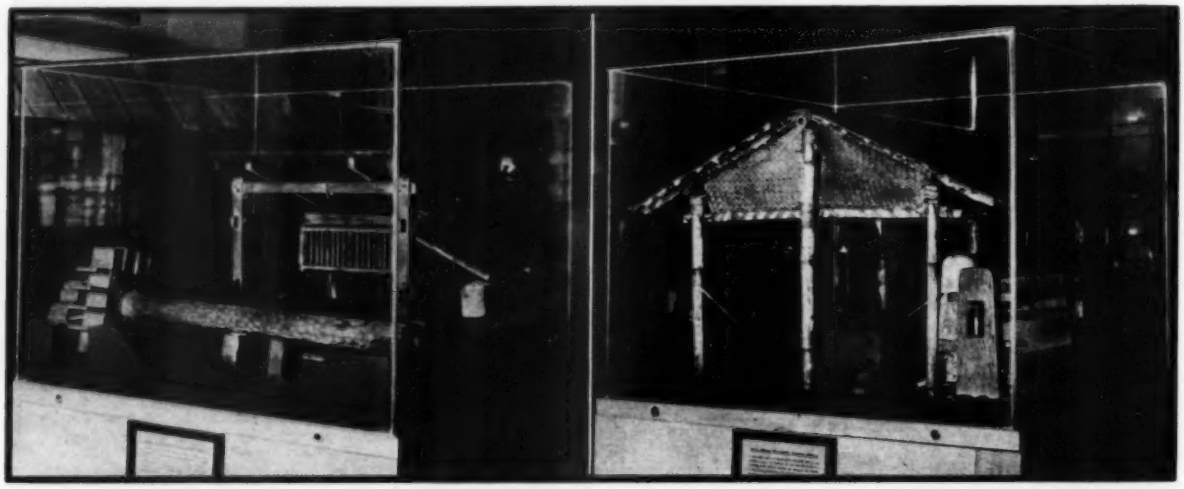
done by William Henry Smith, who invented this style of watermarking in England in 1845. The method of producing line watermarks is made evident by the tools used in forming the outline in wire and showing how the design becomes a part of the screen.

One feature of the exhibit is the comparison of the work produced by the dandy roll upon paper made in a continuous web. It is apparent that for clearness of detail, the dandy roll watermark does not compare favorably with watermarks in a sheet which in cases at interesting pages which tell of their mission. Most important of these are two complete sets by Jacob Christian Schaeffer, who over the period from 1765 to 1771 brought out six books, the leaves of which were paper made from various vegetable fibers. The two sets of Schaeffer's work are displayed to give an idea of the extent to which Schaeffer went in his search for a suitable material as a substitute for rags in papermaking.

Two editions (1800-1801) of the book by Matthias Koops, intended by "stamper" which preceded the beater, showing the later- day evolution in the method of reducing raw material to fiber.

The Introdution of the Papermaking Machine

While the Museum is intended primarily to deal with papermaking during the period before the coming of the papermaking machine which was to give to the world paper in a continuous web, the introduction of the paper machine has a space devoted to it. This exhibit is signalized by



Left—Scale model of stamping mill used for maceration of rags in Arach, North Kashmir. Right—Scale model of primitive paper mill in Yen-Thai, Tonkin, North Indo-China. Mills of this type are in operation at the present time in Indo-China and have been in use for the past 700 years.

have been made in a mold having a screen bearing the imprint of the design. The imprint of the dandy roll on the pulp sheet does not make as clear and distinct an impression as when the pulp flows in a mold and is permitted to form in and about the impression of the design in its screen.

A unique and noteworthy item of the watermark display is the Congreve exhibit. Congreve was the first to experiment with the important use of watermarking in colors. Here is the manuscript book of Sir William Congreve in which he recorded, in 1819, his process of making colored watermarks and his unsuccessful attempt to interest the Bank of England in his process as a safety device for the prevention of counterfeiting bank notes. There are examples of watermarking in red, blue, and yellow in white paper. A striking engraved portrait of Congreve lends a dramatic touch.

Rare Books

What well might be termed a library of books which are the incunabula of papermaking are laid open the author-papermaker to show that a practical paper could be made from both straw and wood, are an important part of the library. Koops's book is a learned treatise containing a "Historical Account of the Substances which Have Been Used to Describe Events, and to Convey Ideas, from the Earliest Date to the Invention of Paper." It also served as a plea to the King of England for protection of his patent and to prevent its being pirated by foreigners. However, Koops's own country remained apathetic, and passed up an opportunity to pioneer in the manufacture of paper from wood pulp.

Of particular interest and importance is a small book in German, which appeared in 1706, and in which the author mentions having seen hollanders or beaters in operation in Saarndam. The exact date of the introduction of the beater by its Dutch inventors has always been uncertain. Here is evidence that it could not have been later than 1706. Accompanying this item are other books opened at illustrations of many forms of the such original documents as correspondence in relation to the patent of Nicolas Louis Robert which could not be financed in France during the French Revolution, but which was developed and perfected in England. There is exhibited a bill of sale and a specification of mill property, evidence that John Gamble sold his mill with its equipment for making paper by hand to finance the development of the Robert invention in England. With the assistance of Bryan Donkin and the financing of the Fourdrinier brothers, the machine was perfected.

Here, then, is an exposition of Paperiana from all parts of the world, representative of papermaking through the ages. Here East meets West on the common ground of papermaking. Here all may view and study, in an easily comprehended arrangement, material of a highly educational and historical value and usefulness, which has taken thirty-five years of diligent and intelligent collecting to accumulate. Well may it be considered a splendid monument, not only to its creator and curator, but to the entire paper industry as well.

PAPER SKETCHES

IN 1837 MANY AUTHORS WERE FORCED TO WRITE TRIVIAL PAMPHLETS RATHER THAN BOOKS BECAUSE OF THE HIGH COST OF PAPER.
A DOME OF PAPER, 30 FEET IN DIAMETER AND WEIGHING TWO TONS, WAS MADE DURING THE 1880'S FOR THE OBSERVATORY AT WEST POINT.
EARLY AMERICAN STRAW BOARD WAS SUN DRIED OUT-OF-DOORS ON THE GRASS.
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1937
1,485,821 TONS
299,596 TONS
IN THE FIFTEEN YEARS 1923-1937 INCLUSIVE, U.S. PACIFIC COAST WOOD PULP PRODUCTION INCREASED FROM 299,596 TONS TO 1,485,821 TONS.

ALLIED

CHEMICAL SHOW WILL EXHIBIT NEW PRODUCTS

The latest products of over forty industries producing materials and equipment will be displayed at the Seventeenth Exposition of Chemical Industries, December 4-9 at the Grand Central Palace, New York City.

Advance indications of the chemicals and chemical raw materiali exhibits show that many will be significant in illustrating the effects of American research methods continuously applied. One exhibitor will feature hydroxylamine hydrochloride assaying 98 per cent and better. A total of 29 gases will be demonstrated by one exhibitor, in addition to cylinders, valves, gauges and controls for mhandling them in the laboratory.

Notable among the packaging equipment on display will be a low-priced Cellophane bag-making machine. This unit is guaranteed to manufacture bags out of Cellophane or similar materials in any size, single or double wall, printed or plain.

Charles F. Roth, president of the International Exposition Company, will again be personally in charge of the New York show.

◆

FLAME-PROOF PROCESSING

A survey as to the use of fire-retarding chemical compounds revealed that the demand for such compounds is increasing steadily, according to technical experts of E. I. du Pont de Nemours and Company.

Processing of specialty products is now being done by a number of the larger textile and paper manufacturers. In addition, flame-proofing service has been made available in many large cities by processors equipped to handle most types of work. Use is being made of the chemicals for treating drapes, paper decorations, workmen's clothing, mattress tickings, fibrous insulation products, building paper, stage scenery and various other materials. Du Pont chemists explain that treatment with fire retardants does not make materials fire-proof, but that the application will prevent the spread of flames and greatly reduce fire hazards.

◆

CHAIN BELT CO. ACQUIRES MASS. CHAIN CONCERN

The Chain Belt Company, Milwaukee, Wisconsin, has acquired the business and all of the net assets of the Baldwin-Duckworth Chain Corporation, Springfield, Massachusetts. The plan of acquisition, which is, in effect, a merger of two well-known and long established companies, provides for the issuance to Baldwin-Duckworth stockholders of 139,537.5 shares of the no par common stock of Chain Belt Company. To provide this stock, the stockholders of the Chain Belt Company approved the authorization of an additional 140,000 shares to bring the total number of Chain Belt Company shares authorized to 500,000.

The Duckworth company was originally established in 1871, its early efforts being chiefly devoted to the manufacture of parts for looms and knitting machines and later, bicycle chains and motorcycle chains. The Baldwin company was established in Worcester in 1896 to produce finished roller chains similar to those made at the Duckworth company.

The Chain Belt Company, established in 1892 as manufacturers of the malleable detachable chain and a line of sprocket wheels, is now one of the leading manufacturers of sprocket chain, conveyors and construction machinery. The merger of Chain Belt and Baldwin-Duckworth grew out of a selling arrangement between the two firms. For some time Chain Belt has marketed finished roller chain made for it by Baldwin-Duckworth. The newly-acquired plants at Springfield and Worcester, Massachusetts, will retain their identity and will be known as Baldwin-Duckworth, Division of Chain Belt Company.

◆

ANNOUNCE NINTH ANNUAL PACKAGE COMPETITION

Announcement is made that details of the 1939 or Ninth Annual All-America Package Competition are to be found in the August issue of *Modern Packaging*, sponsors of this annual event which last year reached an all-time high of 23,000 entries and 65 prize winners.

The All-America Package Competition has, in the natural process of growth from its inception in 1931 with 271 entries, changed its form though not its purpose from year to year. Entry is invited, as always, for any package, display or machinery installation marked during 1939 and there is no fee whatever nor restriction as to the number of entries by any one concern. The current competition closes December 30, 1939. Winners and honorable mention awards will be announced in March, 1940.

◆

PRIZE CONTEST ON INSTRUMENTATION

The Second Annual Instrumentation Contest with a first prize of $200 in cash is announced by the Industrial Instrument Section of the Scientific Apparatus Makers of America. Twelve prizes totaling $500 will be awarded. The contest is open to any person not employed by an instrument manufacturer. Two themes are specified. Each contestant may submit an original report or an essay in support of "Instruments Save Money" or "Instrumentation Makes Jobs." The contest closes November 15, 1939. Copies of the contest ruies and official entry form can be obtained from the Scientific Apparatus Makers of America, 20 N. Wacker Drive, R. 3014, Chicago.

PULP
BLEACHING
COMPANY

■

ORANGE
NEW JERSEY

■

CELLULOSE
PURIFICATION

MORRIS MACHINE APPOINTMENTS

Morris Machine Works, Baldwinsville, New York, announces the appointment of M. H. Morris as president, J. L. Lonergan as vice president and general manager, A. G. Forssell as second vice president, and the reappointment of R. S. Mercer as secretary and treasurer.

All of these officials have been associated with the company for many years. Mr. Lonergan's advancement follows more than thirty-seven years of company service, the last twenty-five of which have been in executive positions. Mr. Forssell has been chief engineer and sales manager for the past five years, before which he had been with the company for several years working on equipment designs. The new executive personnel, therefore, represents a continuance of the company's policies which have been maintained during its seventy-five years of existence.

◆

▶▶▶ FIVE B. F. GOODRICH COMPANY employees recently completed 20 years of service with the organization and are now eligible to join the Goodrich Twenty Year Service club. Those who recently completed one-fifth of a century with the company are: S. R. Potter, district manager; F. E. Wood, salesman; Mrs. Elsa C. Boone, clerk; H. L. Green, salesman, and Edward F. Heckman, salesman. E. N. David, in the Akron office, has recently completed 30 years of service.

◆

▶▶▶ THE RILEY STOKER CORPORATION, Worcester, Massachusetts, has established a new office in Chicago. The office, located in the Marquette Building, is in charge of A. L. Mitchell, Jr., manager, and T. R. Halstead, assistant district manager.

◆

HAERING CO. OFFICES MOVED TO ITS PLANT

D. W. Haering & Company, well-known water consultants, has moved its offices to the plant at 2308 S. Winchester Avenue, Chicago, where adequate space to accommodate an increased office and executive personnel has been provided. The company laboratory will be retained at 3408 W. Monroe Street, Chicago, where the previous office quarters are being altered to provide new and larger library facilities for the research staff.

D. W. Haering & Company was organized in 1931 for the manufacture of glucoside for scale and corrosion control developed through the research

We want another!

Say 9 out of 10 mills after installing their first *Simplicity* gyrating woodchip screen

It's certainly true that "Nothing succeeds like success" — at least in the building of gyrating screens. For paper mills all over the country are more and more turning to Simplicity for speedy, accurate screening. Their order for one seems to be only a signal for more. Here's why—Simplicity gyrating wood chip screens have:

(a) counterbalanced eccentric shaft that assures positive action and smooth operation.
(b) rubber-mounted corners that eliminate vibration in the frame, thus increasing the machine's span of life.
(c) four-way tension on screens.
(d) freedom from whip and blinding.
(e) dust-sealed Alemite lubricated roller bearings.
(f) extra sturdy, all-steel construction.

You, too, will find that it pays to install Simplicity screens. Write today for free catalog.

Two 4'x 20' tandem type Simplicity double deck gyrating chip screens in a large Southern mill.

Simplicity

ENGINEERING COMPANY · DURAND MICH.

activities of D. W. Haering. Starting as a one-man organization, the company has grown into an internationally active corporation with offices in most principal cities and laboratories in Chicago, Wichita, Kansas and New York.

Coincidental with the announcement that the D. W. Haering & Company had moved its offices, was the news of a new line of corrosion-resistant coatings for external application to metal surfaces which has been developed by the company. This line of products introduces the famous organic corrosion inhibitors, developed by Haering research, suspended in non-drying bases for protection from atmospheric and sub-soil corrosive conditions. Identified under the trade name, In-Hib-Co., these products introduce the chrom glucosate compounds for corrosion control to new fields of use. They are prepared in several forms to meet varying temperature requirements and may be applied by brushing, spreading, or spraying on exposed surfaces

◆

NAT'L ADHESIVES CHANGES NAME

The National Adhesives Corporation is now known as National Starch Products, Inc., according to an announcement from the company, which also stated that the company had purchased the Piel Brothers Starch Company of Indianapolis. The latter company will be operated as a division of National Starch Products, Inc.

The National Adhesives Corporation will operate as a division of National Starch Products, Inc., and will continue to manufacture a full line of adhesives, lacquers, and allied products. The management of National Starch Products, Inc., will be identical with that of the National Adhesives Corporation, with Alexander Alexander as chairman of the board and Frank Greenwald as president. The reason for the change of name of the company was that the majority of the company's products are manufacture from starches and in recent years the company has become an important factor in the manufacture of processing of starches for foods, confectionery, textiles and paper.

OTHER COUNTRIES

BRAZIL USES COTTONSEED HULLS FOR PULP

The practical utilization of pulp made from cottonseed hulls in Brazil has been reported by the American Consulate General of Brazil. Hitherto, cottonseed hulls in Brazil have been used for fuel only, but following the discovery that cellulose could be manufactured successfully from the hulls, one of the largest concerns in Brazil curtailed importing pulp from Norway and Sweden and curtailed pulpwood imports from Italy. Patents on the process of making pulp from cottonseed hulls are to be acquired throughout the world, it was reported.

◆

▶▶▶ NEWSPAPER PUBLISHERS IN SPAIN are experiencing a great shortage of paper, it is announced from Madrid, and have asked the Government to permit the importation of paper from Norway and Belgium. According to reports, the scarcity is so great that the newspaper *A. B. C.* is published three times every four days.

◆

▶▶▶ THE CONSTRUCTION OF A NEW POLISH MILL for the production of bleached sulphite pulp suitable for rayon manufacturer was started in Grodno on the Nieman River in 1938. The plant is scheduled to produce between 20,000 and 30,000 tons of pulp annually.

▶▶▶ WASTE PAPER IS BEING USED in Germany to an increasing extent as raw material in the manufacture of paper and cardboard, states a report from Consul J. C. Hudson, Berlin, made public through the Department of Commerce. Approximately 800,000 tons of waste paper were re-manufactured into these items. This represents an increase of 100,000 tons over 1936.

◆

ITALIAN NEWS

Cellulose

Italy is, to a greater extent than ever, producing more and more cellulose within her own confines. Statistics derived from four Italian mills show that the production of cellulose rose from 8,200 tons in 1934 to 40,634 tons in 1938. During the first six months of this year, Italy produced 12,508 tons as compared to 10,744 tons produced during the same period in the preceding year.

A new Italian process for the extraction of cellulose was revealed recently. According to notes forwarded by the Italian correspondent of THE PAPER INDUSTRY AND PAPER WORLD, the new process is said to possess all of the advantages of the common methods without any of the defects. The yield of cellulose is said to be equal if not superior to the sulphite of soda process. The process consists essentially in introducing the material to be pulped into an autoclave with a solution of sulphur dioxide, adding ammonia, and then raising the temperature with steam. Boiling continues for about 4 hours, during which time the liquor is circulated from the bottom upwards.

Another Italian process involves the use of seaweed. In this case, it is explained, the seaweed is boiled with water from 1 to 3 hours, then boiled in an alkaline solution to loosen the alginic acid and the alginates. The pectic substances are washed with acid, hydrolysing the pectines. The mass is then washed in an alkaline solution and bleached.

◆

GERMANY CURBS USE OF PAPER

The German Government has issued an order stipulating that the publishers of periodicals and illustrated journals must effect an economy of 17 per cent in their consumption of paper. As a consequence, publishers are forced to restrict the consumption to 83 per cent of the March tonnage and the economy has to be brought about by reducing the size of the periodicals or by using thinner paper.

Significant is the news that paper mills in Germany have been ordered to use a smaller volume of cellulose in the manufacture of paper. Cellulose is required for the purpose of the armament industry. The German mills are required to use a larger amount of other raw materials as for instance rags and "woody reeds."

YOU *KNOW* YOU'RE RIGHT WITH WRIGHT *Improved High Speed* HOISTS

● Users of Wright Improved High Speed Hoists know they're right—that their hoisting jobs are being handled right, and their hoisting costs showing up right.

Twenty-one points of superiority fit the Wright Hoists to your purposes. There is zinc coating which prevents corrosion. There is a safety guard for the load chain that makes it impossible for the chain to ride out of the pocket, regardless of position. There are precision load wheel bearings that assure fast, smooth, positive action. Eighteen other important advantages go to make the Wright a safe and economical hoist.

The Wright Catalog gives much useful information on hoists, cranes and trolleys. Write for your copy.

BUY ACCO QUALITY *in Wright Hoists, Cranes and Trolleys; TRU-LAY Preformed Wire Rope, Reading-Pratt & Cady Valves; Campbell Abrasive Cutting Machines, American Chains, Page Welding Electrodes and Page Wire Fence.*

Order from your distributor

WRIGHT MANUFACTURING DIVISION · *York, Pennsylvania*

See our exhibit in Metals (Products) Building, Opposite the Perisphere and Trylon, New York World's Fair

AMERICAN CHAIN & CABLE COMPANY, Inc.

AMERICAN CHAIN DIVISION • AMERICAN CABLE DIVISION • ANDREW C. CAMPBELL DIVISION • FORD CHAIN BLOCK DIVISION • HAZARD WIRE ROPE DIVISION • HIGHLAND IRON AND STEEL DIVISION • MANLEY MANUFACTURING DIVISION • OWEN SILENT SPRING COMPANY, INC. • PAGE STEEL AND WIRE DIVISION • READING-PRATT & CADY DIVISION • READING STEEL CASTING DIVISION • WRIGHT MANUFACTURING DIVISION • IN CANADA: DOMINION CHAIN COMPANY, LTD. • IN ENGLAND: BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. • *In Business for Your Safety*

ASSOCIATIONS

BACTERIOLOGICAL PROGRAM OF THE PAPER INDUSTRY

▶▶▶ The use of paper in the food industries has contributed greatly to sanitary packaging of foods. The transition from bulk foods to those packaged and sealed in the manufacturer's plant has progressed to a degree which was considered impossible a few years ago. The demonstrated utility of paper in food packaging has widened its use so that the present time about one-third of the fifteen million ton consumption of paper in the United States is used for packaging food stuffs. Cursory examination of a grocery's shelves will indicate in a tangible manner the extent of this transition.

During the last three or four years, introduction of the paper milk container has made new opportunities for use of paper. Change from "multi-use" glass bottle to the single-service paperboard container has been studied by health authorities. Believing that paper can make just as great a contribution in this new field as it has in the entire field of food packaging, paper manufacturers are eager to co-operate in every way in investigations on paper to be used for paper milk containers. Consumer acceptance and constantly increasing use of paper milk containers, together with satisfactory results secured in research investigation, indicate that we have here one of the finest advances which has been made in the food industry in recent years.

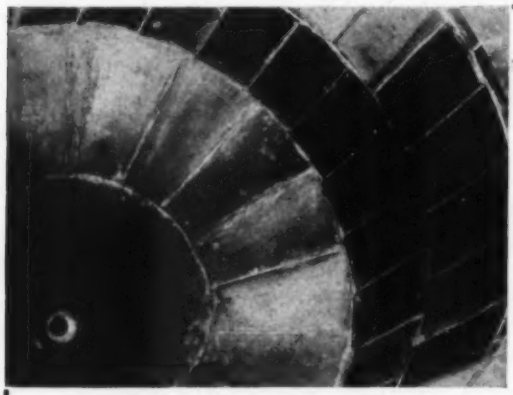
Paper manufacturers have over a long period of years undertaken programs of improvement in operating conditions, not only to increase the utility of paper but also to improve its sanitary qualities. These programs have been carried on by individual manufacturers, either in their own laboratories, by grants to research laboratories, or in co-operation with public and industrial agencies.

In line with this policy, to prevent unnecessary duplication of research in this field and to coordinate work in the future, the industry has recently undertaken a co-operative program which will contribute to better control of sanitation in manufacture of paper, establishment of sanitation standards, development of methods of analysis to accompany such standards and co-operation with health agencies. This coordinated program to be administered through the American Paper and Pulp Association will relate, it is hoped, investigations now in progress and suggest the trend of new experiments. The Association has enlisted The Institute of Paper Chemistry to carry on the fundamental work prerequisite to the establishment of standard technics and to expand through the use of these technics the understanding of sanitary problems involved in the manufacture and conversion of paper to be used in the packaging of foods. Acting with the Institute in an advisory capacity will be Dr. Fred W. Tanner, Professor of Bacteriology at the University of Illinois. Dr. Tanner and the Institute will work closely with a special committee comprised of experts from the paper industry and specially created for this purpose by the Association.

Professor Tanner needs no introduction to those in the food industry. He is the author of two books, *The Microbiology of Foods* and *Food Borne Infections and Intoxications*, widely used in the food industry, and some one hundred scientific papers. He is also Editor-in-Chief of *Food Research*, a technical journal in which are published results of original investigations in the fields of food and beverage technology.

The combination of Dr. Tanner and The Institute of Paper Chemistry brings together as authoritative and impartial a group of paper technologists as it is possible to secure. The Institute of Paper Chemistry, with its distinguished personnel and well-equipped facilities for research, is co-operating in the entire effort.

(This article is reprinted from a recent release sent out from the American Paper and Pulp Association in New York City.—EDITOR'S NOTE.)



TANKS AND LININGS

for Acid Storage Processing and Pulp Bleaching

PYROFLEX provides a continuous leak-proof lining for steel or concrete tanks or towers. It may be applied in your plant and requires no vulcanizing. It is adaptable without a tile covering for caustic solutions and acids of non-oxidizing character.

KNIGHT-WARE brick or tile linings combined with Pyroflex protected steel or concrete shells make the most durable and corrosion proof equipment available for acid work.

Ask for our bulletin No. 712 entitled "Tanks That Can Take It."

BOX 111 **MAURICE A. KNIGHT** AKRON, OHIO

ADVERTISING PAGES REMOVED

SAFETY

ATLANTIC CITY TO BE SCENE OF SAFETY CONGRESS

Atlantic City — "The Convention City of the World"—is the scene this year of the Twenty-Eighth National Safety Congress, to be held October 16-20 at the New Jersey resort city. The headquarters for the Congress will be Convention Hall which will be completely turned over to the safety meeting. This whole building, the largest of its kind in the world, has a total seating capacity of nearly 75,000. In its gigantic halls and meeting rooms will be held most of the regularly scheduled meetings of the Congress. In it, also, will be the Safety Exposition, displaying the latest in safety equipment and materials.

There are many things of interest scheduled for the Paper and Pulp Section meetings, among which are talks on "Back Injuries in the Paper Industry, Their Cause and Prevention;" "Value of Accident Statistics;" "The Supervisor's Place on the Safety Program;" and other pertinent safety discussions. One of the highlights of the Paper and Pulp Section will be the presentation of the major safety trophy to the winning mill in the safety contest.

D. D. Fennell, president of the National Safety Council, will preside at the annual meeting of members on October 16. At this general meeting addresses will be given by General E. C. Rose, vice president of the Public Service Corporation of New Jersey and General Chairman of the New Jersey National Safety Congress Committee; Governor Leverett Saltonstall of Massachusetts; and Frances Perkins, Secretary of Labor.

◆

PORT EDWARDS MILL LEADS IN SAFETY CONTEST

The Port Edwards mill of the Nekoosa-Edwards Paper Company is leading the Nekoosa mill at the halfway mark in the annual safety contest between the mills, having suffered only four lost-time accidents to five at the Nekoosa mill. This lead gives the Port Edwards mill the edge on the $250 award to go to the mill with the best safety record, in addition to sharing in the $1,000 award to be distributed on a basis of departmental safety at the end of the year.

The number of accidents recorded for the first six months of 1939 is about 50 per cent under those for the corresponding period of 1938.

◆

ONE MILLION HOURS WITHOUT AN ACCIDENT

One million hours without a single lost-time accident is the fine record of the soda mill division of the Oxford Paper Company, Rumford, Maine. The period without accidents began in 1935 and passed the million mark last June.

In honor of this record, one hundred employees of the department were congratulated at a dinner held at the Hotel Harris in Rumford. Martin Amero, representing the employees, was presented with an engraved plaque by R. L. Clair, representing Boston insurance companies.

KINK OF THE MONTH "in the interests of more efficient cleaning"

SAVES HOURS IN CLEANING SAVE-ALLS

Clean your save-alls with a fast working Oakite solution Speedy, penetrating Oakite action swiftly carries away dirt, sizing, rosin, starch and other clogging deposits . . . cleans thoroughly . . . in amazing short time.

"Best cleaning job we've ever seen" is what one superintendent says about Oakite save-all cleaning. And you will agree. What's more, you will be surprised at the economy of Oakite cleaning. Write for full information.

OAKITE 1909 1939 30

Manufactured only by

OAKITE PRODUCTS, INC.
16 Thames Street New York, N. Y.

Representatives in All Principal Cities of the U. S.

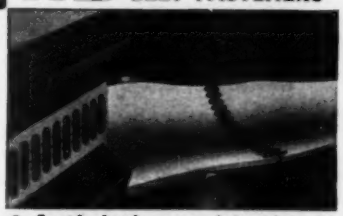
OAKITE *Certified* CLEANING
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Keep your conveyor belts going with

FLEXCO

HD BELT FASTENERS

• FLEXCO H D RIP PLATES are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.



• Avoid shutdowns and lengthen the life of your conveyor belts and bucket elevator belts by using Flexco HD belt fasteners and rip plates. Thousands of companies have stepped up the performance of conveyor lines and cut costs by using Flexco methods.

• FLEXCO H D BELT FASTENERS make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Five sizes in steel and alloys.

Folder WRP shows exactly how to make tight butt joints in conveyor belts with Flexco HD Belt Fasteners. Also illustrates step by step the latest practice in repairing rips and putting in patches.

FLEXIBLE STEEL LACING COMPANY
4606 Lexington St., Chicago

Write for your copy

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

THE PAPER INDUSTRY ANNUAL SAFETY CONTEST

July 1, 1938 to June 30, 1939

Final Rankings of Contestants as of June 30, 1939

Division One—Paper and Pulp Mills

Final Rank	Unit	Man-Hrs. Worked	Disab. Inj.	Freq. Rate
	Group A (Units averaging 100,001 or more man-hours per month.)			
1	Anglo-Canadian Pulp & Paper Mills, Ltd., Quebec City, P. Q., Canada	1,423,056	2	1.405
2	Hollingsworth & Whitney Co., Algonquin & Tannnet Mills, Waterville, Me.	2,836,836	6	2.115
3	Oswego Falls Corporation, Fulton, N. Y.	1,737,662	6	3.453
4	Champion Paper & Fibre Co., Canton, N. C.	4,006,262	15	3.689
5	Mead Corp., Chillicothe, Ohio	2,793,783	11	3.937
6	International Paper Company, Hudson River Mill No. 3, Palmer, N. Y.	1,855,265	9	4.851
7	Mead Corp., Kingsport, Tenn.	1,209,788	6	4.960
8	Nekoosa Edwards Paper Co., Port Edwards, Wis.	1,281,796	7	5.461
9	Bird & Son, Inc., East Walpole, Mass.	1,400,591	8	5.712
10	Container Corp. of America, Philadelphia	1,783,179	11	6.169
11	Kieckhefer Container Co., Delair, N. J.	1,388,666	9	6.481
12	Kimberly-Clark Corp., Lakeview-Badger-Globe Mills, Neenah, Wis.	2,106,296	14	6.645
13	Canadian International Paper Co., Mill No. 10, Three Rivers, Quebec, Canada	1,687,182	13	7.705
14	Kimberly-Clark Corp., Kimberly, Wis.	2,002,134	16	7.991
15	Consolidated Paper Corp., Ltd., Laurentide, Grand 'Mere, P. Q.	1,327,419	11	8.287
16	Anglo-Newfoundland Development Co., Ltd., Grand Falls, Newfoundland, Canada	2,664,834	25	9.381
17	Bryant Paper Co., Kalamazoo, Mich.	1,582,646	15	9.478
18	Hammermill Paper Co., Erie, Pa.	2,801,367	29	10.352
19	International Paper Co., Otis No. 4, Chisholm, Me.	1,327,339	14	10.547
20	Consolidated Paper Corp., Ltd., Wayagamack, Three Rivers, P. Q., Canada	1,596,778	17	10.646
21	Crown Zellerbach Corp., Crown Willamette Paper Co., Div., Camas, Wash.	3,601,040	45	12.496
22	Brown Paper Mill Co., Inc., Monroe, La.	2,093,136	27	12.899
23	Gulf States Paper Corp., Tuscaloosa, Ala.	1,702,146	22	12.925
24	Masonite Corporation, Laurel, Miss.	2,772,859	37	13.344
25	International Paper Co., Niagara Falls, N. Y.	1,421,596	19	13.365
26	Marathon Paper Mills Co., Menasha Div.	2,003,616	29	14.474
27	Spruce Falls Power & Paper Co., Ltd., Kapuscasing, Ont., Canada	1,971,382	29	14.710
28	Kimberly-Clark Corp., Niagara Falls, N. Y.	2,595,157	41	15.799
29	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., West Linn, Ore.	1,299,481	22	16.930
30	Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.	1,829,339	39	21.319
31	Marathon Paper Mills Co., Rothschild, Wis.	1,553,328	39	25.107
32	Northwest Paper Co., Cloquet, Minn.	1,930,878	49	25.377
33	N. B. International Paper Co., Dalhousie, N. B.	1,428,398	37	25.903
34	Alton Box Board Company, Alton, Ill.	1,247,245	36	28.864
	Group B (Units averaging 60,001 to 100,000 man-hours per month.)			
1	St. Croix Paper Co., Woodland, Me.	786,303	2	2.544
2	Consolidated Paper Corp., Ltd., Belgo, Shawinigan Falls, Quebec	1,099,400	3	2.729
3	Champion Paper & Fibre Co., Houston Div.	852,381	3	3.520
4	Paterson Parchment Paper Co., Bristol, Pa.	1,120,713	4	3.569
5	Kimberly-Clark Corp., Niagara Mill, Niagara, Wis.	1,090,676	4	3.667
6	Southern Kraft Corp., Continental Div., Marinette, Wis.	817,327	3	3.671
7	Hoberg Paper Mills, Inc., Hoberg Div., Green Bay, Wis.	1,081,806	4	3.698
8	Pioneer-Div.—The Flintkote Co., Los Angeles	1,038,937	4	3.850
9	Nekoosa Edwards Paper Co., Nekoosa Mill, Port Edwards, Wis.	1,101,037	6	5.449
10	Thilmany Pulp & Paper Co., Upper Mill, Kaukauna, Wis.	994,949	6	6.030
11	P. H. Glatfelter Co., Spring Grove, Pa.	909,457	6	6.597
12	Hummel-Ross Fibre Corp., Hopewell, Va.	1,062,605	7	6.982
13	International Paper Co., Fort Edward, N. Y.	958,281	7	7.305
14	Mead Corp., John H. Heald Div., Lynchburg, Va.	812,011	6	7.389
15	Fraser Paper Ltd., Madawaska, Me.	1,060,060	8	7.547
16	Fraser Paper Ltd., Edmunston, N. B., Canada	1,139,932	10	8.772
17	A. P. W. Paper Co., Inc., Albany, N. Y.	1,934,243	10	9.669
18	Crown Zellerbach Corp., National Paper Products Co. Div., Port Townsend, Wash.	897,105	9	10.032
19	Detroit Sulphite Pulp & Paper Co., Detroit	914,461	10	10.935
20	Mead Corp., Dill & Collins Co., Philadelphia	1,154,323	15	12.995
21	Watervliet Paper Co., Watervliet, Mich.	912,827	12	13.145
22	Consolidated Paper Corp., Ltd., Port Alfred, Quebec	1,058,284	15	14.174
23	Rayonier Incorporated, Grays Harbor Div., Hoquiam, Wash.	1,051,675	16	15.214
24	Container Corporation of America, Ogden Div., Chicago	1,040,471	16	15.378
25	Thilmany Pulp & Paper Co., Lower Mill, Kaukauna, Wis.	745,420	13	17.440
26	American Box Board Co., Grand Rapids, Mich.	1,126,027	23	19.537
27	Fibreboard Products Inc., Division II, Los Angeles	1,008,458	23	22.806
28	Racquette River Paper Co., Potsdam, N. Y.	857,300	21	24.496
*	P-124	677,589	16	23.613
	Group C (Units averaging 30,001 to 60,000 man-hours per month.)			
1	Hoberg Paper Mills, Inc., Fibre Div., Green Bay, Wis.	494,540	1	2.022
2	Southern Kraft Corp., Continental Div., York Haven, Pa.	627,029	2	3.190
3	Finch, Pruyn & Co., Inc., Glens Falls, N. Y.	566,412	2	3.531
4	Escanaba Paper Co., Escanaba, Mich.	542,152	2	3.689
5	Strathmore Paper Co., Woronoco, Mass.	522,081	3	5.746
6	Strathmore Paper Co., West Springfield, Mass.	634,561	4	6.304
7	International Paper Co., Little Island, North Tonawanda, N. Y.	619,250	5	8.074
8	Rayonier Inc., Port Angeles Div., Port Angeles, Wash.	612,689	6	9.793
9	American Writing Paper Corp., Linden Div., Holyoke, Mass.	376,403	4	10.627
10	Lawrence Paper Co., Lawrence, Kan.	446,000	5	11.211
11	Rayonier Inc., Shelton Div., Shelton, Wash.	662,063	8	12.083
12	Rising Paper Co., Housatonic, Mass.	396,340	5	12.615
13	Cornell Wood Products Co., Cornell, Wis.	604,192	8	13.241
14	Central Fibre Products Co., Quincy, Ill.	540,819	8	14.792
15	American Writing Paper Corp., Riverside No. 2, Holyoke, Mass.	381,241	6	15.738
16	Bedford Pulp & Paper Co., Big Island, Va.	377,798	6	15.882
17	Container Corp. of America, Coated Board, Chicago	503,129	8	15.900
18	Crystal Tissue Co., Middletown, Ohio	467,067	8	17.128
19	Port Huron Sulphite & Paper Co., Pulp Mill, Port Huron, Mich.	405,901	7	17.246
20	Consolidated Water Power & Paper Co., Biron, Wis.	631,243	11	17.426
21	Bergstrom Paper Co., Neenah, Wis.	382,280	7	18.311
22	Ontonagon Fibre Corp., Ontonagon, Mich.	366,244	8	21.843
23	Central Fibre Products Co., Hutchinson, Kans.	436,282	10	22.921
24	Eddy Paper Corp., White Pigeon, Mich.	586,544	15	25.573
25	Bemis Bro. Bag Co., Peoria, Ill.	655,140	20	30.528
26	Consolidated Water Power & Paper Co., Appleton, Wis.	423,676	14	33.044
27	Restigouche Co., Ltd., Campbellton, N. B., Canada	599,725	20	33.349
28	Container Corp. of America, Wabash	478,886	18	37.587
29	North Carolina Pulp Co., Plymouth, N. C.	676,696	28	41.378
30	Flintkote Co., New Orleans, La.	627,903	26	41.408
31	Union Bag & Paper Corp., Fenimore Paper Mill, Hudson Falls, N. Y.	377,520	22	58.275
32	Container Corp. of America, Fernandina, Fla.	454,257	55	121.077
	Group D (Units averaging 6,000 to 30,000 man-hours per month.)			
1	Spaulding Fibre Company, Inc., Milton, N. H.	180,138	0	0
1	U. S. Gypsum Co., North Kansas City, Mo.	166,077	0	0
1	American Writing Paper Corp., Mt. Tom Div., Holyoke, Mass.	160,833	0	0
1	Hollingsworth & Whitney Co., Aroostook & Cobbossee Mills, Gardiner, Me.	130,874	0	0
1	Central Fibre Products Co., Vincennes, Ind.	126,635	0	0
1	Mead Corp., Nashville, Tenn.	125,965	0	0
1	Central Fibre Products Co., Mt. Carmel, Ill.	105,651	0	0
1	Hollingsworth & Whitney Co., Abenaquis Mill, Madison, Me.	88,723	0	0
1	Spaulding Fibre Co., Inc., Hayes Plant, North Rochester, N. H.	72,582	0	0
10	Mead Corp., Sylva Paper Board Co., Sylva, N. C.	292,718	1	3.416
11	Central Fibre Products Co., Tama, Iowa	282,410	2	7.082
12	Rogers Fibre Co., Inc., Fibreboard Mill—Div. 1, Bar Mills, Me.	131,435	1	7.608
13	American Asphalt Roof Corp., East St. Louis, Ill.	232,898	2	8.587
14	Bird & Son, Inc., Phillipsdale, R. I.	316,019	3	9.493
15	Flintkote Co., Little Ferry, N. J.	286,672	3	10.465
16	Crown Zellerbach Corp., Crown Willamette Paper Co. Div., Lebanon, Ore.	269,524	3	11.13
17	American Writing Paper Corp., Nonotuck Div., Holyoke, Mass.	232,634	3	12.896
18	Mead Corp., The Harriman Co., Harriman, Tenn.	300,725	4	13.301
19	International Paper Co., Livermore No. 11, Livermore Falls, Me.	136,043	2	14.701
20	Container Corp. of America, Circleville, Ohio	307,849	5	16.242
21	Mead Corp., Southern Extract Co., Knoxville, Tenn.	304,096	5	16.442
22	American Writing Paper Corp., Crocker Div., Holyoke, Mass.	323,784	6	18.531
23	Fort Orange Paper Co., Box Board Mill, Castleton on Hudson, N. Y.	268,765	5	18.604
24	International Paper Co., Webster Mill, Orono, Me.	251,366	5	19.891
25	Flintkote Co., Lockport, N. Y.	314,955	7	22.225
26	Upson Co., Lockport, N. Y.	346,014	8	23.120
27	Mead Corp., Wheelwright Div., Leominster, Mass.	283,726	8	28.196
28	American Writing Paper Corp., Parsons, Holyoke, Mass.	273,515	8	29.249
29	International Paper Co., Riley No. 23, Riley, Me.	100,182	3	29.945
30	French Paper Co., Niles, Mich.	266,008	8	30.074
31	Northwest Paper Co., Brainard, Minn.	2802,59	9	32.113
32	Consolidated Water Power & Paper Co., Stevens Point, Wis.	244,681	9	36.783
33	Union Bag & Paper Corp., Allen Paper Mill, Hudson Falls, N. Y.	259,120	12	46.311
34	American Writing Paper Corp., Gill. Div., Holyoke, Mass.	125,205	7	55.908
35	Port Huron Sulphite & Paper Co., Paper Mill, Port Huron, Mich.	315,287	18	57.091
36	Container Corp. of America, Carthage, Ind.	358,319	21	58.607
37	American Asphalt Roof Corp., Kansas City, Mo.	192,887	13	67.396
38	Alton Box Board Co., Lafayette, Ind.	136,963	12	87.602
†	P-164	25,097	0	0
*	P-141	104,490	2	19.141

Division Two—Paper and Board Re-Manufacturing Plants

Final Rank	Unit	Man-Hrs. Worked	Disab. Inj.	Freq. Rate
1	Container Co., Van Wert, Ohio	303,056	0	0
1	Gaylord Container Corp., Dallas, Tex	159,783	0	0
1	Bay West Paper Co., Green Bay, Wis	90,851	0	0
4	Bird & Son, Inc., Norwood, Mass	941,744	2	2.124
5	Barber Asphalt Corp., Madison, Ill	305,417	1	3.274
6	Bird & Son, Inc., Chicago	293,039	1	3.413
7	Union Bag & Paper Corp., Chicago Bag Factory, Chicago	536,542	3	5.591
8	Fort Orange Paper Co., Paper Box Plant, Castleton on Hudson, N. Y.	497,689	3	6.028
9	The Flintkote Company, Chicago Heights, Ill	726,730	5	6.880
10	Bird & Son, Inc., Shreveport, La	135,937	1	7.356
11	Gaylord Container Corp., Houston, Tex	126,951	1	7.877
12	Container Corp. of America, Chicago	631,339	5	7.920
13	Union Bag & Paper Corp., Grocer Bag Factory, Hudson Falls, N. Y.	366,830	3	8.178
14	F. J. Kress Box Co., Pittsburgh	410,099	4	9.754
15	Kimberly-Clark Corp., Atlas Mill, Appleton, Wis	290,769	3	10.317
16	Union Bag & Paper Corp., Specialty Bag Factory, Hudson Falls, N. Y.	889,530	10	11.242
17	Flintkote Co., Rutherford Plant, E. Rutherford, N. J.	884,955	10	11.561
18	Chicago Carton Co., Chicago	687,250	10	14.551
19	Barber Asphalt Corp., Barber, N. J.	442,508	7	15.816
20	Container Corp. of America, Cincinnati, Ohio	418,692	8	19.107
21	Gaylord Container Corp., Bogalusa, La.	884,135	17	19.227
22	Marathon Paper Mills Co., Wausau Div	540,68	11	20.338
23	Container Corp. of America, Cleveland	196,005	4	20.408
24	Container Corp. of America, Anderson, Ind	240,726	7	29.079
25	Container Corp. of America, Natick, Mass	168,918	5	29.600
26	R-28	684,690	23	33.592
27	Marathon Paper Mills Co., Ashland, Wis	415,188	14	33.720
*	R-23	919,105	4	4.352

(*) Final report missing—covers eleven months only. Not ranked.
(†) Ineligible. Exposure below minimum requirements of rules. Listed for comparative purposes.

CONTINUOUS FREENESS

Automatically Indicated and Recorded Putting Stock Freeness continuously in Plain Sight of the Workmen. For Details:

ARTHUR B. GREEN, Engineer in Paper Making
284 Harris Avenue, Needham, Massachusetts

"You Can Take It For Granted"—

SOLVAY
Liquid Chlorine

IS *ALWAYS* STANDARD!

When a Company has maintained the most rigid of production standards over a period of 58 years . . . you can rely upon its name and on its products! Scientific methods . . . exacting supervision have made SOLVAY LIQUID CHLORINE a bleaching agent on which you can depend . . . that you can take for granted will be always pure, always uniform, when you receive it!

And when you place your order with Solvay for LIQUID CHLORINE . . . SODA ASH . . . CAUSTIC SODA . . . you are guaranteed fast, sure, on-time deliveries. You are relieved of worry, of check up . . . time spared for your own problems.

Write for full information and prices. Ask for free copy of 44-page book "SOLVAY LIQUID CHLORINE."

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 RECTOR STREET NEW YORK

REDUCE PIPING COSTS AS MUCH AS 25%

Whether it's a new line or a replacement—you can reduce its cost up to 25%, install it faster and save the trouble and expense of future maintenance by using Armco Spiral Welded Pipe.

First costs are lower because Armco pipe is "tailored" to fit your individual requirements. Standard or special fittings come already welded to straight pipe runs. This eliminates a pair of flanges at every bend, saves hours of tedious assembly. Fewer gaskets mean less chance for leakage, lower maintenance costs. Then too you gain years of high operating efficiency because Armco pipe is smooth inside and its wall thickness is uniform throughout. There are no threads to weaken the metal and invite corrosion.

Order Armco Spiral Welded Pipe in diameters ranging from 6 to 36 inches; wall thicknesses from 7/64 to ½ inch. Specify either ARMCO Ingot Iron or steel with your preferred coating, including galvanized after fabrication. Just address The American Rolling Mill Company, Pipe Sales Division, 211 Curtis Street, Middletown, Ohio.

ARMCO

ARMCO SPIRAL WELDED PIPE

Convention Papers . . . Abstracted

Tomorrow's Stock Preparation—Today

JOE BAXTER, Jr.
Shartle Brothers Machine Company

The ideal pulper is that piece of equipment that will separate each individual fibre from its adjacent fibers without in any way changing the characteristics of those fibers. This is impossible to achieve 100 per cent, since natural hydration will take place to a limited degree; but so far as fraying or cutting of fibers is concerned, it can be achieved.

We have three expedients by which pulping rate can be increased—concentration of impact, increasing edgewise absorption, and use of hot water.

There are available today four main types of pulpers. The four types are the Hollander beater type, the Lannoye pulper type, the Shredder type, and the Miami High Density Pulper (formerly Tugboat Annie).

The beater as a pulper is slow, because the full width of the bar strikes the sheet at relatively low speed (about 1500 ft. per minute) and the impact is spread over a large area. Instead of striking through the sheet, the roll will jump, allowing sheet to pass under it until it has become sufficiently saturated to disintegrate. It is generally accepted that the rubbing action of fiber upon fiber is conducive to better pulping, especially at higher densities. In the beater, due to low consistencies, this beneficial effect can not be fully utilized.

It has been found that the power distribution in the beater is approximately 80 per cent for circulation only, and 20 per cent for actual work on stock; either pulping or with roll down hard on bed plate.

Figuring water used, power lost, danger of contamination of one color with another, and labor involved, washdown time on a beater is highly important; and reduction of this time means lower production cost.

The Lannoye type of pulper has one redeeming feature in its ability to handle consistencies up to 30 per cent. This high consistency is only to be desired where bleaching or chemical treatment is desired in as concentrated form as possible. Pulp laps or baled paper coming to it must be fairly well separated, or fluffed, before being fed. The action is similar to that of chewing, since there are stationary teeth past which revolving teeth pass. There is, however, a decided tendency to discharge small flakes of paper rolled into tightly wound balls, the center of which is only partially moist. For large production, this type of pulper does not have sufficient capacity and works a hardship on the subsequent refining equipment such as jordans, etc. Installation is such that an attendant must feed at a constant rate to secure uniform results.

In view of our previous definition of a pulper, the shredder type does not fully meet the conditions. It reduces the pulp to a flowable condition only, but not pulped in the full sense of the word. It is, however, a continuous method of securing the type of shredded material it produces.

During the past few years, more than one hundred installations of the Miami high density pulper have been made. These installations cover the pulping of straw, kraft, sulphite, groundwood, shavings, box shop clippings, hard ledgers, and bottle cap.

A brief description will enable you to see why this type of pulper is efficient.

A single shaft, having twelve breaker arms and an impeller mounted on it, is rotated within a circular chamber having a side opening at the inlet and an end opening at the discharge. Connecting from the discharge is a midfeather type tub, having a steep sloping bottom, that slopes downward and connects to the inlet connection to the pulping chamber. The connection from the discharge to the tub is through a large vertical pipe terminating in a rotary type valve, that permits a stream of pulped stock to be by-passed to the inlet, to act as a submerging stream on incoming stock.

The shaft is driven at 860 r.p.m., which gives a tip speed of 4300 ft. per minute on the breaker arms; and each breaker and propeller arm is so constructed that the impact is centered over a linear distance of approximately 2 in.

The rate at which stock can be fed will vary, depending on its hardness, but on stocks similar to sulphite 400 lb. per minute is regularly obtained with one man feeding. On harder stocks, such as ledger and kraft, 300 lb. per minute can be handled. Sulphite and soda laps, 2 in. thick, pass O. K.; and kraft sheets, 1 in. thick, cause no trouble. Shavings, box clippings, and fluffy stock are readily handled by submerging with the by-pass stream.

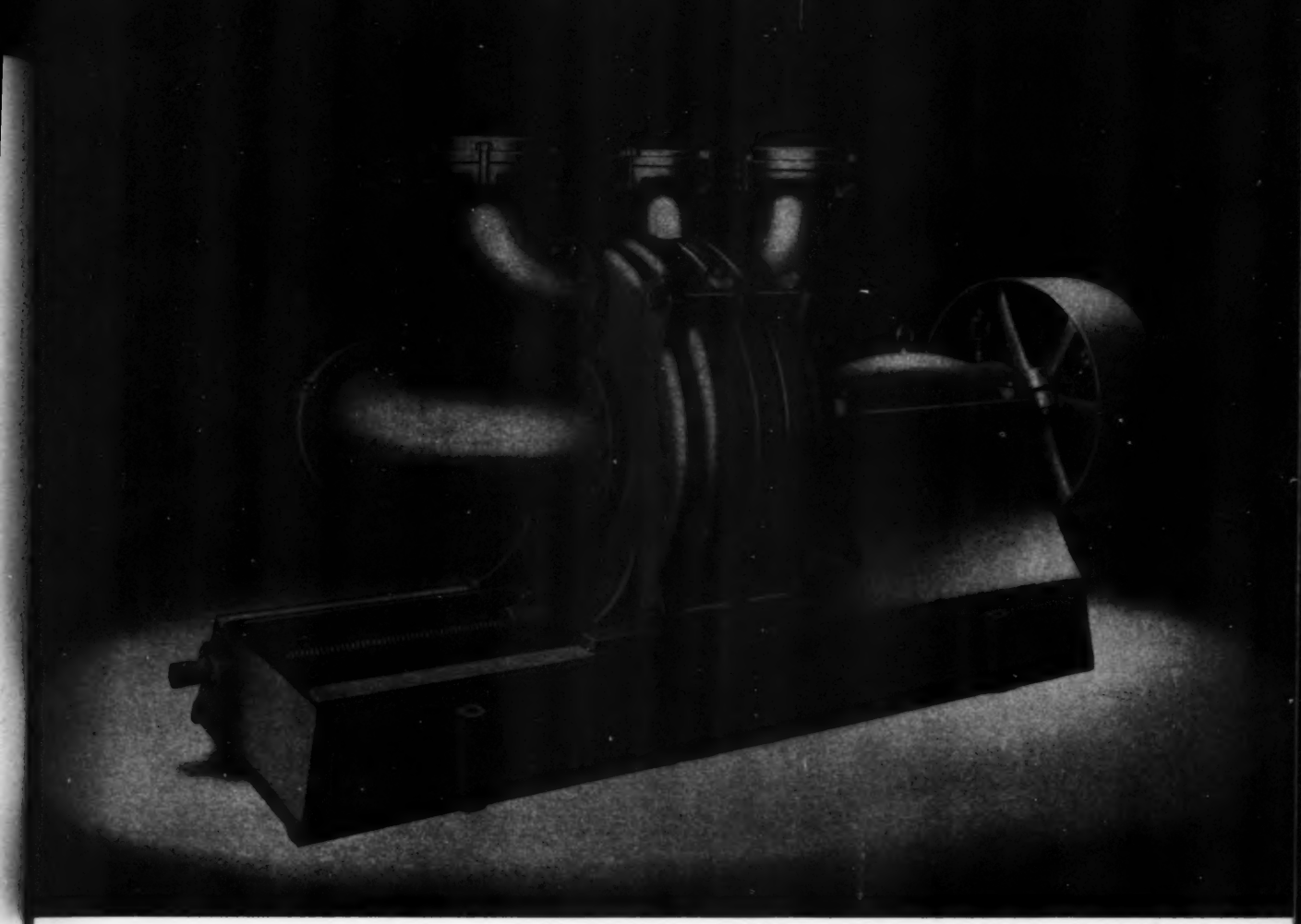
Although it is more economical to handle larger batches, the Miami pulper will handle from 500 lb. to 5 tons with equal facility and thoroughness. A typical cycle on 3000 lb. batch of sulphite and soda requires about twenty-five minutes. During this time, our power will reach momentary peaks of 120 hp., dropping to 90 hp., then to 70 hp. as soon as last sheets have made one pass.

The mixing of colors, starch, alum, etc., is effected in two passes through the pulper.

There is a small pulper available for tests in your own mills on your own stocks. It

The accompanying abstracts are of papers presented at the annual meeting of the American Pulp and Paper Mill Superintendents Association, June 13-15, 1939, at Washington, D. C. Other installments of these abstracts appeared in the July and August issues. (This concludes papers that were abstracted from that meeting.)

FREDERICK Centrifugal PUMPS
CLOGLESS FOR HI-DENSITY STOCK
CENTRIFUGAL PUMPS FOR ALL PAPER MILL PURPOSES
ASH CONVEYORS——————STOKERS
THE FREDERICK IRON & STEEL CO.
DEPT. D, FREDERICK, MARYLAND



Cowles
CLASSIFINER

Realizing that new production methods and improved equipment are the real answer to the present day demand for better quality but less costly paper, the Dilts research and engineering departments are constantly producing more efficient machinery to meet stock preparation problems.

The Cowles Classifiner shown here is exclusively Dilts-built and embodies 71 years of Dilts engineering experience and skill. Carefully designed and expertly constructed, it is a highly efficient unit for defibering and clarifying waste paper stock. It occupies only one-tenth the space and uses much less power than the type of equipment formerly required to do the same volume of work.

As a unit, the Cowles Classifiner is designed to fit into the systems now in use or as a part of Dilts special stock preparation systems. Its simple construction permits repairs or inspection of parts quickly and easily.

Dilts engineers are always available to help you solve stock preparation problems peculiar to your mill. Feel free to write us at any time.

Dilts

DILTS MACHINE WORKS, Inc., FULTON, N. Y.

uses 7½ hp. and is scaled to dimensions and impact to correspond with results of large pulper.

May we suggest that the term, "refiner," designates that piece of equipment by which the characteristics of the fibers may be modified to suit requirements, both as to freeness drop and resulting Mullen, tear and tensile. There are five types of refiners available, considered in light of this definition: roll and bed plate type, hammer or rod mill type, impact type, plate or disc type, and conical plug and shell.

A study of refiners now available brings out the importance of centrifugal force, number of bar passes, angularity of shear, length of dwell within refining chamber, temperature, bar arrangement and clearance.

Referring to the beater, the centrifugal force is bound to be low; the number of bar passes per fiber is low; and the angularity-of-shear is limited due to elbow given bedplate.

The hammermill or rod mill type of refiner will make "fish eyes" at low consistency. If consistency is increased to eliminate the rod to rod contact, we secure only a "squshing" action of fiber upon fiber. This action is beneficial, but slow.

The impact type of refining attempts to use the same principle as that secured from centrifugal force but uses excessive power in forcing stock through nozzles at sufficient velocity to approximate the slushing secured in a conical refiner.

This brings us up to the plate or disc refiner or attrition mill. Here we have two opposed discs rotating in opposite directions, fed through the center of one plate. This arrangement gives a large number of bar edge passes, but does not have sufficient turbulence chamber between those edges. The discharge cannot be throttled, else, the plates will rapidly fill up and scorch due to high speed.

The conical plug refiner is designed to secure high peripheral speed, with resulting centrifugal force. It is designed to handle relatively high consistencies, that is, 6 per cent to 8 per cent on groundwood, sulphite, soda and similar stocks and 5 per cent on kraft.

By using alloy castings for both plug and shell fillings, the angularity-of-shear can be set to suit the stock being made. By throttling the discharge, the stock can be made to hurdle the spiral bars and in this way secure rapid hydration.

The plug of a conical refiner can be more accurately positioned due to the fact that considerable longitudinal travel is required to bring the bars closer together. This permits vernier adjustment without elaborate mechanism.

If we attach a conical refiner to the Miami pulper, it is possible as soon as pulping is complete, to use the tub as a retaining and circulating chest and cycle the stock through the refiner and back to the tub until the desired effect is secured. Hence, the name, "Cyclifiner," has been given to the refiner.

Most refining action is given today in terms of freeness drop, although this by no means tells the whole story. The amount of freeness drop desired will vary with different stocks as well as the freeness drop per pass through the Cyclifiner. However, as a general rule on ordinary papers using sulphate, groundwood and soda, five passes meet maximum requirements. On hard stock, such as kraft, Mitscherlich, etc., provision should be made for ten passes or more.

On soft stocks, such as soda, groundwood, and sulphite, cyclifine at 6 to 8 per cent; and for kraft, use a consistency of approximately 5 per cent.

In order to handle sufficient stock at high density, we must have a large suction pipe to the refiner. Hence, trouble is apt to occur when the pipe is reduced to size of openings in refiner. Therefore, check the openings to throat and don't get less than 10 in.

The very design and function of a refiner places its logical location in the basement; while you probably will want the controls on the first floor. To adjust the plug by remote control involves some arrangement that permits withdrawal of plug when starting and return to operating position when up to speed.

The Cyclifiner is in successful operation on straw, kraft, sulphite, groundwood, shavings, box clippings, bottle cap and filler stock. In these respective installations, it was possible to ease off the jordans over the previous operations using beaters.

The stock preparation of tomorrow will follow these lines—pulp in a high density pulper, drop to chest to which is connected a Cyclifiner, repeat furnish in pulper, drop to second chest equipped with a second Cyclifiner. As soon as stock in first chest has been refined, throw over with Cyclifiner or pump to jordan chest. Give light jordaning to machine. In some cases the jordan will be eliminated.

It is doubtful if any one phase of stock preparation has been neglected more than that of agitation. There are, you might say, three types of agitators, the paddle or swash plate design, the propeller or plain circulating type, and the combined circulating and intermixing type.

One defect of the paddle agitator is its inability to blend the stock dropped from two different beaters or pulpers at consistency over 2½ to 3 per cent. Even this consistency requires a long time to give near uniform results.

The swash plate design, which is a circular steel sheet set on the shaft at an angle, overcomes some of the faults of the paddle type, but we still have places for stock lodgement, and it is ineffective at high consistency.

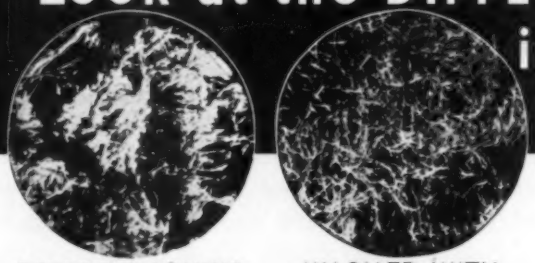
The purely circulating type goes only part of the way towards securing proper agitation. It simply moves the stock from one side of a midfeather chest to the other by means of a propeller.

The last type of circulating and intermixing agitator produces more than just circulation. You do not only want movement of stock, you want intermixing of stock, and you want to deliver this stock to your screens while it is in its greatest state of suspension.

The unit for this purpose has been given the name, "Agi-flo" pump. It is a combination circulating agitator and centrifugal pump, used in conjunction with scientifically designed baffles, to deliver a constant volume of thoroughly mixed paper stock.

At least three mills are running today

Look at the DIFFERENCE in These FELTS!



BEFORE WASHING

WASHED WITH FELTEX

When your felts get into the "loaded" matted condition shown in the left hand picture, what do you do to clean them? Soap powders, soda ash, and similar materials can wash them, but they're hard to rinse out—and fail to give you a properly reconditioned felt.

With MAGNUS FELTEX

you get the soft, porous full-napped felt shown at the right. Feltex not only insures cleaner, softer felts, but because of its effective non-damaging action, adds so much to the working life of your felts that this one feature alone pays back the cost of the material many times over.

If you've never tried Feltex—you owe it to yourself to give it a real trial now.

GET A TRIAL BARREL

Use it on your felts. If after 30 days you are not completely satisfied, send the unused portion back for complete credit on the entire barrel.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants

192 South Avenue Garwood, N. J.

Magnus CLEANERS

more than 200 in ten years

every 14 working days...another

ROSS Removable Panel HOOD

practically standard equipment for modern mills

Up to 1929 B.D. (before depression) machine hoods were not very popular. Paper makers know the reason. Then came the ROSS Removable Panel HOODS. Since that time, 210 machines have been equipped with these efficient hoods. This steady demand has required us to turn out a hood on the average of one every 14 working days for ten years, including the depression years.

Only the years of experience in designing and skill in building possessed by Ross engineers could account for the popularity of these ROSS HOODS. Ross Hoods are fire-proof, acid resisting, and impervious to heat and moisture. They permit uninterrupted machine operation. Quickly and easily installed or altered. No wonder they are today practically standard equipment for modern mills.

A copy of our new Bulletin No. 17 describing Ross Regular and Special Hood Designs will be sent on request to our office nearest you.

J. O. ROSS ENGINEERING CORPORATION

Main Office — 350 MADISON AVE., New York, N. Y.

201 North Wells St. CHICAGO, ILL.

12953 Greeley Ave. DETROIT, MICH.

2960 N. W. Front Ave. PORTLAND, ORE.

ROSS ENGINEERING OF CANADA, LIMITED, Dominion Square Building, Montreal

ENGLISH ECCO CLAYS TRADE MARK CLAYS

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

entirely independent of beaters by using the pulper and cyclifining methods as well as agi-flo pumps.

The question of screening is simply to make sure that no fibers that have not been sufficiently processed get into your sheet. Obviously, if pulping, refining, and agitation are done properly, the screens will work at full efficiency and with fewer rejects. A number of mills that think they need more screening capacity, in reality need better stock preparation ahead of the screens.

Steam Turbines for Paper Mill Application

K. S. KRAMER
Westinghouse Electric & Mfg. Company

The fuel cost per ton of paper produced is of particular importance to those who superintend the operation of paper mills. Considering it only as a thermo dynamic problem, the minimum fuel cost is obtained when the by-product power is a maximum.

Each paper mill has its own particular conditions and problems. The extent to which by-product power can be generated and the selection of the proper turbine application to serve this purpose in most instances involve careful and lengthy studies. Details of turbine design, of course, vary with the different turbine builders.

Starting with the smallest and simplest type, there is the single Curtis stage unit with a single governor valve controlled by a mechanical shaft governor. This turbine, alone or through a reduction gear, is used to drive all types of machinery, such as fans, blowers, pumps, etc.

The same turbine can be used to drive the paper machine, and all or part of the exhaust steam used in the drying rolls. However, for this application, a relatively close speed regulation is required over a wide range of operating speeds. With a centrifugal weight transformer type of governor, we have a turbine suitable for a paper machine drive.

Multi-stage-multi-valve units also are available for the same type of application.

In using electricity as the driving force for operation of paper machines, direct current motors are invariably used because of their suitable operating characteristics. However, considerable alternating current power is also used. This use of both a-c. and d-c. power permits in some cases of a very flexible arrangement so as to maintain a steam and load balance. This arrangement consists of a non-condensing turbine driving a direct current generator and an alternating current synchronous generator. The steam flowing through the turbine is always just that quantity required for process. Hence the power developed by the turbine is dependent upon and varies with the demand for process steam. When the power thus generated is in excess of the d-c. requirements, this excess power drives the a-c. generator which feeds into the a-c. system of the mill. When the power generated by the turbine is not sufficient to satisfy the d-c. requirements, the a-c. generator performs as a motor feeding from the a-c. mill system and supplies the added power required to drive the d-c. generator to meet its requirements. The a-c. generator, being tied in with the mill a-c. supply, maintains the speed of the unit.

Another arrangement of electric drive is the sectional electric drive employing the starting generator system of control and providing carbon pile type voltage and section speed regulator. The sections of the paper machine are driven by individual d-c. motors through suitable gear reduction. Power for driving these sectional motors is furnished by the main turbine driven d-c. generator. A starting generator serves to "inch," "start," and "accelerate" the individual sections of the paper machine. In starting, each section motor is first connected to the inching generator, and, when at operating speed, is transferred to the running generator.

Many mills have a power supply of alternating current, requiring the use of conversion apparatus and driving the paper machines with large motors connected to the ordinary line shafting, rope or chain drive or with the sectional drive employing separate motors for the individual sections. In the larger mills and particularly where there is a combination pulp and paper mill, power requirement becomes quite high and consequently turbo-generator sets of relatively large capacity are employed.

There is a large variety of turbine drives available for paper mill application. A careful study should be made to select the type which will result in the maximium by-product power consistent with other necessary considerations.

In the quest for power cost reduction, it should be borne in mind that there are numerous potential sources of by-product power, some of which may not even be suspected of having such possibilities. There will be a trend towards higher pressures and temperatures. Some mills also are considering means of increasing the steam pressures and temperatures for their existing equipment. This can be done, in some cases, by new boilers and revamping of existing turbines, or where existing turbines cannot be changed economically, the result is obtained by the installation of a topping unit. With turbines available in all manner of sizes and types from the single wheel unit to the double automatic extraction unit and for any steam pressure from 60 lb. to 600 lb. and higher, the paper industry is not hindered in this respect in making the most of by-product power with its attendant low power cost.

Our Amazing Industry

GEORGE K. GIBSON, Sales Manager
Mosinee Paper Mills Co.

The first question you are going to ask is "What is so amazing about our Industry?"

To me, the oustanding, amazing thing is that the paper industry, contrary to general belief, is the most necessitous industry in America. We are by no means the greatest tonnage industry, nor the largest in value of its products; but viewed from the standpoint of indispensability, the paper industry is "tops."

Paper is the inidispensable commodity. As one national authority wrote a few years ago: "The paper industry, as a whole, is old, at times is tired and frequently overcrowded, yet it is indispensable. There is no economic substitute for paper—on the contrary, it is constantly being siubstituted for other materials, that are more expensive. The most striking characteristic of this industry is its endless diversity; the many products that may come from it; and the innumerable uses to which it can be put."

The demand for more and greater quantities of paper products is unquenchable, as is best shown by the constant rate of the increase in consumption. Someone asks: "Where is the saturation point? When will it stop?" It won't stop. There is no saturation point in sight. The substitution of

ADVERTISING PAGES REMOVED

pulp and paper for other raw materials has but begun.

Instance the substitution of kraft paper for cotton in making bags, towels and napkins.

In 1937, the world used 900,000 tons of bleached sulphite for rayon and staple fiber production, and it is estimated that by 1946, 3,000,000 tons will be required.

I have before me a list of well over a hundred standard commodities which base their origin in wood pulp or paper. This list can be quadrupled and then not cover all.

Nothing shows the phenomenal growth of paper products consumption as does the record of per capita consumption in the United States:

In 1899, the per capita consumption was	58 lb.
In 1909, the per capita consumption was	93 lb.
In 1919, the per capita consumption was	124 lb.
In 1929, the per capita consumption was	223 lb.
In 1937, the per capita consumption was	241 lb.

Look at the per capita consumption of other countries:

Great Britain	134 lb.
Belgium	106 lb.
Norway	98 lb.
Denmark	96 lb.
Germany	94 lb.
France	33 lb.
Soviet Russia	10 lb.
Roumania	8 lb.

(These are the latest figures obtainable, but all of the countries of the world are increasing their use of paper products rapidly.)

The paper industry is easily divided into two periods: before wood and after wood (B. W. and A. W.).

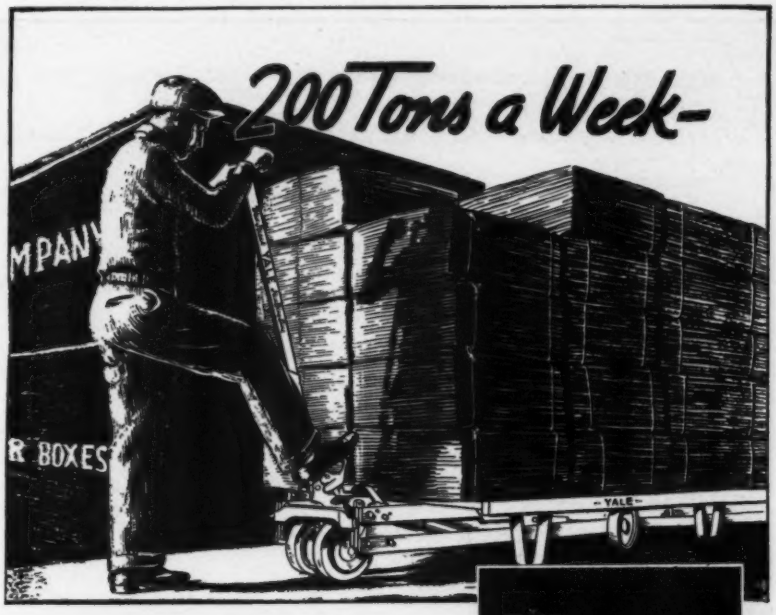
From 1869 to 1932, the production of wood pulp in the world grew to 15,709,000 tons at the close of 1931, which was at the average yearly rate of 250,000 tons increase. From 1932 to 1938, the world's production of wood pulp topped 28,000,000 tons, or at better than 2,000,000 tons per year for those six years. .The consumption of paper products in 1932 was approximately 8,100,000 tons in this country; in 1937, it was 15,688,000 tons, and the available capacity of production was 15,000,000 tons.

The United States is the greatest producer of wood pulp in the world, but it is also the greatest consumer of paper products. We consume a full 50 per cent of the world's production of wood pulp products.

In 1925, there were only 497,000 tons of kraft pulp production in this country. In 1937, the capacity grew to 2,317,000 tons, but the consumption that year was 2,916,000 tons—a six-fold increase in 13 years. In 1925, sulphite pulp production capacity in the United States was 1,719,000 tons; in 1937, it grew to 2,369,000 tons, but the consumption was 3,309,500 tons—almost 100 per cent increase in 13 years.

What about our wood supply? Have we sufficient forest resources to sustain our already tremendous volume of tonnage and take care of the additional increase which is immediately ahead of us? Yes! If?

If we can protect our present forests from being ruthlessly ravished, burned and depleted as were the gorgeous forests which our past generations had in the New England states, in Pennsylvania, New York, Ohio, Indiana, Michigan, Wisconsin, and Minnesota, then we may have a sufficient supply. If we can immediately begin a



HANDLED BY YALE LIFT TRUCKS

200 tons of corrugated boxes a week—a lot of paper for *any* trucks. But that's the job that YALE Lift Trucks perform for the Great Southern Box Company every week in the year. And perform perfectly!

Following are some excerpts from a letter written by Mr. A. O'Shaughnessy, Vice-President of the Great Southern Box Company:

"The YALE system of hand lift trucks and skid platforms is the most efficient system of handling our product that we know of. We could not do without it. Maintenance cost is remarkably low — practically nothing. The Blue Streak is the easiest and fastest truck to operate that we have ever used. It is impossible to get a 'flying handle', and we have never had an accident of any kind. ***You cannot improve on YALE service.***"

"You Cannot Improve on Yale Service"—the keynote of YALE success!

Every truck that leaves our plant is the best of its kind. The safest—the most economical—the most efficient. Profit by the experience of industrial executives like Mr. O'Shaughnessy. BUY YALE!

Look in the phone book for your nearest YALE representative.

THE FAMOUS YALE BLUE STREAK— Single Stroke Hand Lift Trucks, 2,500 Lbs. Capacity.
NARROW FRAME MODEL
WIDE FRAME MODEL
YALE MARKED IS YALE MADE

YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U.S.A.
IN CANADA: ST. CATHARINES, ONT.

"NON-USERS ARE THE LOSERS"

TENAX FELTS

FINISH AND SPEED

UPTURN HAS COME!

Every day now we get reports of mills increasing production. Better yet, we get real tangible indicators in the form of additional orders for TENAX FELTS . . . chosen because of profitable records shown by their predecessors in the same and neighboring mills.

"Non-Users Are The Losers"

LOCKPORT FELT COMPANY

Newfane, N. Y. — U. S. A.

forest conservation policy supported by the Government and the States, and backed up by adequate appropriations to carry on the work, and above all, inaugurate a national forestry policy, which will prevent the cutting of any timber publicly or privately owned at a rate greater than its annual growth or increment, then, I am willing to concede that history will not repeat itself and that our remaining most precious resources—the forests—shall not be destroyed.

National Forest control of timber cutting is the principle factor which has preserved the forests of Norway, Sweden, Germany, Finland, and France, and of the Provinces of Quebec and Ontario in Canada where provincial supervision of timber cutting has been adopted within the past three years.

We need, to make our conservation certain, further legislation to insure wise cutting practices and then ample national and state appropriations to insure the carrying to complete continuous functioning the splendid Forest Service program, and to back it all up with a powerful public opinion.

The Alpha and Omega of the paper industry is a tree. And, as I behold the marvelous unfolding of this cellulose era, I say, like the centurion of old, when he beheld the great miracle, "Surely this is an amazing industry."

Paper Machine Filming Processes

PETER J. MASSEY
Combined Locks Paper Company

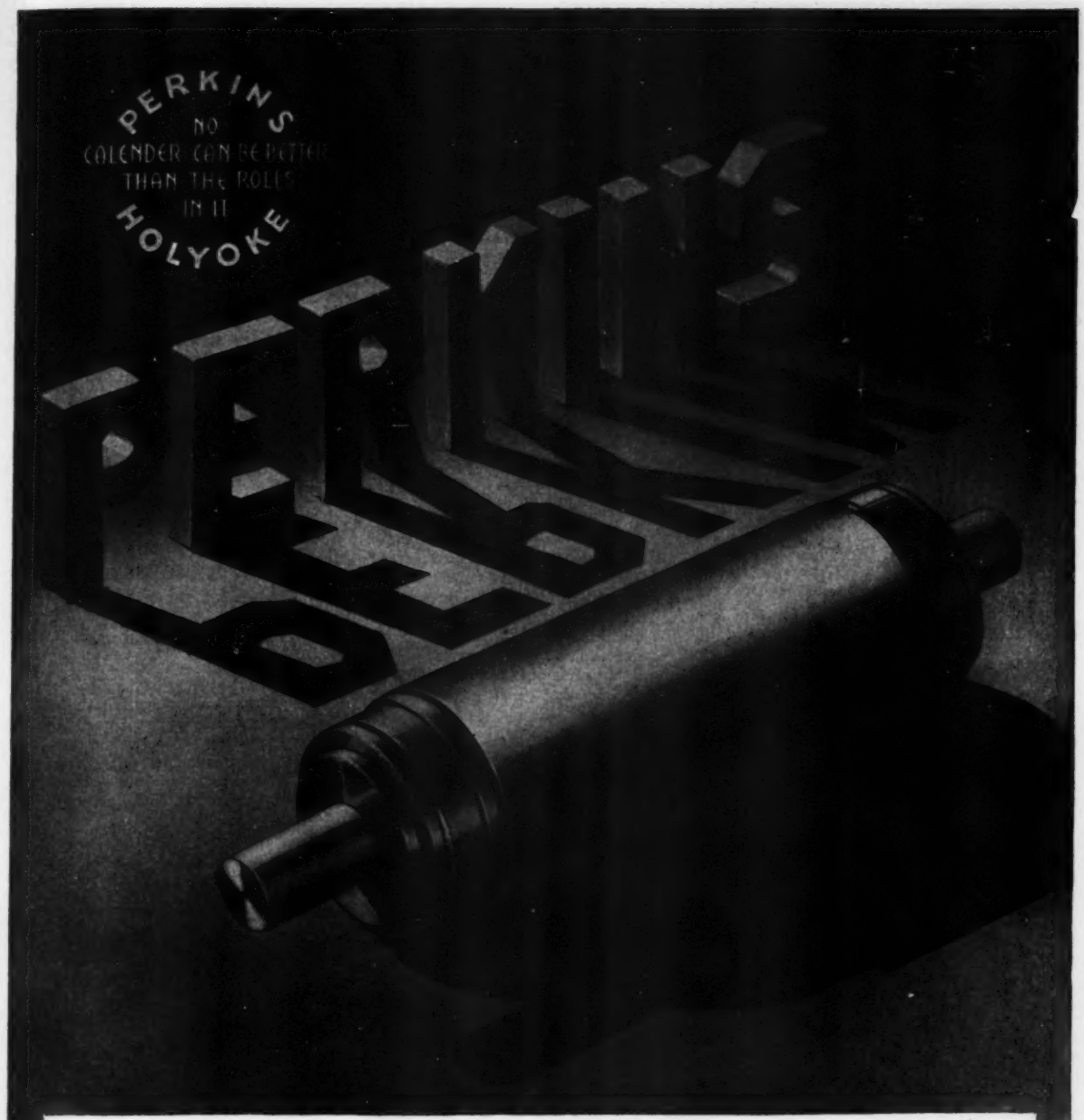
Machine coating is necessarily a production activity of large volume and its economies in the production of coated paper are due to this basic fact. As I see the picture of the future, the old line coating mills will bear the same relationship to machine coating mills that specialty paper mills have to large tonnage paper mills today. Their success will be directly proportional to their diversification in the number and quality of the specialized coated papers they produce and their ability to produce new lines of coated paper of equivalent tonnage.

In the next few years, due to the impetus created by the need for improved quality in the various branches of our industry, we shall see the machine coating operation installed in all production mills, irrespective of type of paper produced. Indicative of this trend is the present development in book, magazine, catalog, waxing and board mills. The demand for machine coated newsprint is upon us today; and its production is only awaiting the solution of national and international complications, such as the duty on Canadian machine coated newsprint.

Machine coating substitutes minerals for valuable fibrous material to the extent of at least 25 per cent. The mineral is of much lower cost per ton than the fibrous contents of the furnish, and the handling, preparation and delivery to the machine much lower for coating color than equivalent tonnage costs of fibrous material. Therefore, the costs per ton of finished coated paper at the end of the machine are lower than any paper of approximately physical constants produced on the machine without coating.

In considering the installation of machine coating in any individual mill, it is essential that we study the possibilities of expanding present machines to permit installing a coating unit and still maintain the same or increased drying capacity to insure economical operation. Having established the physical possibilities of installing coating equipment, the question arises as to the necessary funds to make the installation and whether the period necessary for the development of the product, training the personnel and the exploitation of the finished material can be safely allocated.

The first step in the development of the machine coater should be its use for improving the present mill products without change of any basic materials and procedures now established. Before any new product is decided upon, due study must be made to insure that the basic paper produced will have all the necessary physical and chemical constants required in the coated product. Select the product you are to make only after studies have insured the possibility of making it with the type and quality of raw materials your mill is now set up to use. It is just as ridiculous for a sulphite mill to attempt to duplicate a groundwood content coated sheet by installing a machine coater as it would be



The superior finishing qualities of Perkins Calender Rolls are the natural result of the broadest experience in this highly specialized field of manufacture.

Perkins refills and remakes include the rolls of any manufacture, domestic or foreign, for any application in the paper industry.

B. F. Perkins & Son, Inc., Holyoke, Mass.

ENGINEERS AND MANUFACTURERS

Investigate the possibilities of the

BRASSERT *Automatic* **STRAINER**

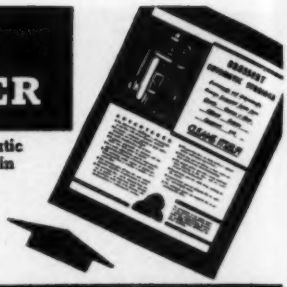
in Your Mill:

In many exacting services, Brassert Automatic Strainers are showing notable efficiency in the continuous and automatic removal of suspended solids from liquids.

Pulp and Paper Mills employ the Brassert Strainer for primary water filtration, as well as for recovery and filtration operations where the percentage of foreign matter in the fluids treated is high and the volume very large.

These Advantages of the Brassert Strainer May Mean Lower Costs for You

The Brassert Strainer is self-contained, on one base. ● It requires minimum space — cost of installation is low. Screening media consists of glazed porcelain or stainless steel discs—non-corrosive and easily backwashed. The Brassert Strainer requires but little power, practically no attention. It is adapted to fibrous and granular material—non-clogging. ● It is built in sizes from 2" to 30" line connections; may be installed in or out of doors.



●**Bulletin P1** *contains complete engineering data and performance characteristics. For a free copy, drop a card to*

H. A. BRASSERT & COMPANY, 310 South Michigan Avenue, Chicago, Ill.

for a board mill to install a machine coater to produce coated litho label stock.

Paper machine coating should be looked upon as one of the developments that had to come to keep pace with the printing and consuming industries and as a beneficial move on the part of the paper industry to meet present day demands for finer work in the art.

Cost and Standards in Finishing Room Operations

WM. RIEGERS
Beckett Paper Company

In 1938, the cost of direct labor in our finishing department was 43 per cent of our total finishing cost; indirect labor in that department was 11 per cent; overhead applied to finishing was 28 per cent; and materials, including packing and shipping materials, amounted to 18 per cent.

One of our most troublesome problems has been the reduction of shrinkage due to waste during the various finishing operations. The finishing processes are considered as a whole and by the operation. We know at all times exactly what every operation costs us and why.

Our principal grades are: offset, cover paper and embossed greeting card papers. The application of fancy finishes is a very large factor in our finishing operations. Something more than 95 per cent of all of the paper we ship is trimmed four sides and less than 1 per cent of the paper we ship is shipped in roll.

We have concentrated on increasing the efficiency of our finishing department and on improving the production of individual workers and units of workers. To this end, we adopted several years ago the Dyer System of Labor Control.

The purpose of the Dyer System of Labor Control is to establish a standard rate of work for each worker and for each operation, and then measure the actual output or production of each worker against that standard. If it is found that the worker's actual production exceeds the production specified by the standard for any one eight-hour day, the amount of the saving to the company is calculated and the saving is shared with the worker. If the worker's production is less than the specified standard, he is not penalized.

A very great advantage of this system is that it reveals whether a man is unfit for his particular job and gives us an opportunity to provide other work for him which he may be able to do better.

The amount of work which can be produced in one minute at the standard rate which has been determined by time study is called a "unit." If a man works at such a rate that he produces 60 of these standard units within an hour, he is said to be working at a 60 unit hour; in other words, he is a standard worker. If, by the development of special skill or by working a little harder than he otherwise would because of the prospect of making a premium, the worker produces 75 units per hour, this man nas produced 15 units more than the standard requires and is entitled to be paid premium for the production of these extra 15 units of work. The premium is calculated as follows: The amount a man earns in a minute is calculated by dividing his hourly rate by 60, and this minute pay is multiplied by the number of extra units of work he produced.

Workers keep their own time and are allowed a certain amount of time out for trips to the rest rooms and are allowed time out if, through no fault of their own, they run out of material with which to work or if some other factor which they cannot control forces them to stop production.

The average earned premium throughout our mill is about 10 per cent of the base pay of all workers who are subject to the premium system. Some of our operations do not seem suitable for the application of this plan, but in all cases where the system has been applied, it is popular with the men and has resulted in great savings to the company, probably between 10 per cent and 15 per cent of what our labor cost would be if we had not installed the system.

Certain supervising foremen and the superintendent of the finishing department are paid premium also on the basis that they are to some extent responsible for the efficiency and output of their department.

From this explanation you will gather that the establishment of a set of standards and the payment of premium on this basis are a very simple thing, but I assure you that this is not the case. The standard must be exactly right the first time because it cannot be changed if an error is discovered. If the standard is too high, so that the men cannot earn premium, you dare not reduce it for fear of ruining your efficiency; if too low and you have to heighten it, you demoralize the workmen who are affected and make them feel that they are being very unfairly treated.

Modifying Sheet Characteristics Through Starch Application in the Tub

R. D. SMITH
Stein Hall Manufacturing Company

New methods of coating, as well as new developments in the ink industry itself, have demanded of the starch manufacturer definite types of products to meet the specifications of the converter, printer, and ultimate consumer. In surface sizing a sheet of paper, we definitely change its characteristics, and through the use of different types of conversions impart to the sheet characteristics typical of that particular type of conversion. Furthermore, by varying concentrations as well as temperature, we still alter and obtain certain desired characteristics.

The M. I. T. folding endurance of the sheet improves with increased concentration and temperatures. In considering a starch product to improve the folding endurance of a sheet, we should select the type of conversion that permits good penetration and still retain an appreciable strength factor. Through the use of this type of conversion we have obtained improved fold in concentrations as low as one per cent and further improvement at the higher concentrations.

Our experience has been such that generally I believe it can be concluded that those conditions in starch products favoring film development promote water resistant properties to the tub sized product.

There is no question but that we can materially increase the Mullen of a sheet of paper through the use of starch in the size press. On the same base sheet of paper we have obtained the same Mullen through the use of one type of conversion run at 6 per cent to 7 per cent solids as against another type of conversion run at 4 per cent solids, every indication leading us to believe that the main difference was in surface characteristics. In the former case, a penetrating type of conversion was used; while a stronger film forming product was used in the latter case.

Dependable!

Fig. 102
BRONZE GLOBE

Fig. 150
BRONZE GLOBE

Fig. 375
BRONZE GATE

That one word — *Dependable* — describes Powell Valves.

Dependable — because they give years of trouble-free performance.

Dependable — because they are manufactured by a company whose integrity has made Powell Valves the accepted standard for controlling steam, water, oil, gas, air, liquids, and other media.

Specify

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

REDUCE PAPER HANDLING COSTS

- Paper rolls can be handled easily and safely with one operator by means of a Cleveland Tramrail system with motor driven grab.
- Above grab requires little headroom and handles rolls horizontally by gripping ends. Grab at right has swivel pads for turning rolls in either vertical or horizontal position while load is in suspension. Simple push button control.

Also Builders of
CLEVELAND CRANES
All Welded

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1151 Depot Street Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Porosity in the sheet as far as starch is concerned seems to be a direct function of viscosity and the ability of the product to form a protective non-porous film. We have increased the porosity of a sheet from 150 seconds to over 500 seconds in the size press. I understand from offset printers that better register is obtained on a free sheet. In this case it would seem advisable to give the stock less hydration in the beater and depend upon the tub to meet the Densometer test and produce a type sheet that would hold the ink to the surface.

The sheet subjected to the highest concentration and temperatures resulted in the highest tensile value. Tensile seems to show the same trend as in the case of fold. Stretch also showed this same trend; and those sheets which were subjected to the higher concentrations and temperatures were capable of stretching further before breaking.

The tear test varied only over a comparatively small range, but I believe that it is commonly accepted that the tearing strength of a sheet of paper becomes less as the amount of starch associated with the sheet is increased. And, too, variation in tear seems to depend a lot upon the type of sheet, high grade rag sheets showing very little change in many cases, while some kraft and sulphite sheets vary to a greater extent.

The original base sheet gave a Dennison pick test of 12. A 1 per cent starch solution increased this to 15; a 3½ per cent solution to 17½; and a 15 per cent solution to 23½. The highest wax test obtained was in that sheet in which the concentration at the tub was 15 per cent solids and run at the higher temperature.

Many boards, as they have been made, permit too much ink to penetrate into the sheet. One of the most efficient means of improving the printability of this type of board is to tub size it; but inasmuch as very few board machines are equipped with size presses, it has been necessary to resort to a high retention type of beater starch. In many cases, the mills add this somewhere between the jordan and the machine, as the jordan results in a mechanical degradation of the starch and tends to lower its retention.

Obtaining good eraser as well as pen and ink seems to be a matter of using a type of starch product which will penetrate to a certain extent and give good internal bond so that upon erasing, the fibers will not end up—and still maintain certain filming characteristics which are favorable for good pen and ink. This latter test was made by examining the ink line under a low powered microscope and detecting which one was free of feathering.

Bleaching Kraft Pulp

THOMAS W. TOOVEY, Pulp and Paper Technologist

Pennsylvania Salt Manufacturing Co.

Bleached kraft consumption in the United States has risen from 100,000 tons in 1933 to 415,000 tons in 1938; while the production has risen from 62,000 tons to 320,000 tons in the same period. The kraft development in the South has resulted in the installation of bleach plants of a large total tonnage in recent years and the contemplated program indicates a large increase in the near future.

Bleaching of soda and kraft pulps has engaged the attention of the industry almost as long as the manufacturing process itself. In fact, a patent for the bleaching of soda pulp was granted eighty-five years ago.

The recent paper by Bixler (*Paper Trade Journal*, Dec. 30, 1937) on "The Effect of Digestion of Wood Structure" opens up a very profitable field of research. Bixler's findings go a long way toward explaining some of the difficulties of bleaching kraft.

In kraft, we have not only the lignin to remove by bleaching, but also certain organic dye stuffs similar to phlobotannin. Holtzer (*Paper Trade Journal*, Sept. 20, 1934) has investigated these materials and advises that the oxidation of these dyes makes them more difficult to remove. He also suggests two ways of avoiding their presence in the unbleached pulp. One is by over-cooking the pulp with dilute white liquor, which is an expensive process. The second is to wash the pulp with dilute white liquor, which is an expensive process. The chlorination treatment of kraft renders the coloring matter soluble in caustic alkalies. The oxidized phlobotannins, after chlorination, are soluble in strong alkalies but not particularly soluble in solutions of alkaline earth metals.

In order to obtain a kraft of high strength and to maintain this strength dur-

WEST COAST HEMLOCK PULP
PULP DIVISION ‡ WEYERHAEUSER TIMBER COMPANY

HIGHEST QUALITY CLAYS

LUMP AND POWDERED } IMPORTED DOMESTIC { CRUDE CRUSHED, AIRFLOATED, WATER WASHED

PAPER MAKERS IMPORTING CO. INC. BOSTON, PENNSYLVANIA, U.S.A.

PRECIPITATED CALCIUM CARBONATE

ing bleaching, a multi-stage system must be resorted to. It is apparent from Bixler's work that the majority of incrustants remaining in the kraft pulp lie between the primary and secondary walls. This being so, they must be removed without injuring the primary wall. The individual chemical treatments, therefore, must be mild; and the removal of the products of reaction is important.

Color reversion of the pulp is one of the drawbacks of bleached kraft. Since the majority of the incrustants present in the pulp are protected by this wall of cellulose, it is possible that, although they may be bleached white, they have not been removed by the washing. These products tend to revert in color with age and heat. Some of the work done by Hamm (*Paper Trade Journal*, Nov. 16, 1923) is of interest in this connection.

The bleaching of kraft may be divided into three main groups: (1) continuous systems; (2) semi-continuous systems; and (3) batch systems. The choice between the three systems is governed largely by the requirements of the individual plant. The number of stages which can be used may vary. The main types in use in Europe are as follows: (1) three stages of chlorination and one of hypochlorite; (2) two stages of chlorination and two hypochlorite; (3) one stage of chlorination and three hypochlorite; (4) one stage of chlorination and two hypochlorite.

Recently there has been a revival of a system similar to that outlined in a patent granted to MacMillian in 1925 (U. S. Patent, 1,547,138—1925). This method was, in effect, the pretreatment of the pulp with hypochlorite before chlorinating it.

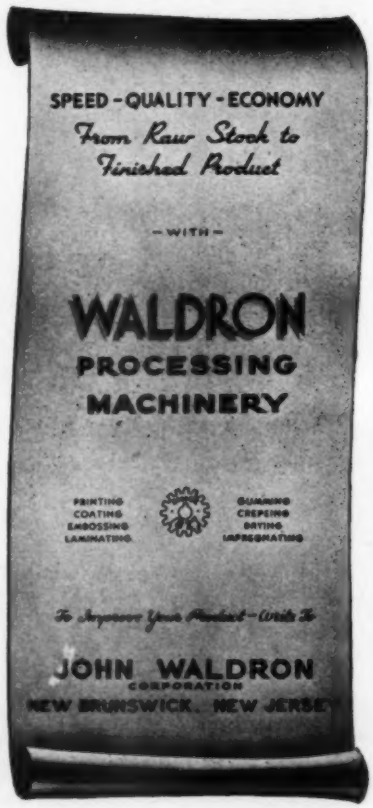
The chlorination stages are generally followed by an alkaline treatment. This may take the form of neutralization or a definite alkaline treatment at higher temperatures. In order to effect good washing, there is often a diffusion wash stage added after the alkaline treatment. This is generally carried out at 3-3½ per cent consistency for three-quarters of an hour with a wash before and after. Sometimes the second alkaline treatment is carried out with sufficient excess alkali to enable the waste liquor from a screw press to be returned to the first alkali treatment. Another method which has been in use for some time is to defer the alkaline treatment until after the first hypochlorite stage.

With the equipment available today, it is possible to install a bleaching plant in which the various stages may be adjusted to suit the individual properties of the pulp to be treated. In this way, a degree of flexibility can be attained which was not possible in the past.

Coated Paper Finishing

WARD WHEELER
Appleton Machine Company

In finishing a sheet of coated paper, what we are striving to obtain is a surface that is flat, in many cases, that is glossy, and that is free from imperfection. The tool that we use to accomplish this result is the calender or supercalender, which is composed of both iron and paper or cotton rolls.



We polish the sheet by an action with the nip on a supercalender. That action is created by a change in diameter at the point of the nip. The amount of that action is the function of the amount of depression we get into the roll, so if we want a lot of polishing action, we use a soft roll.

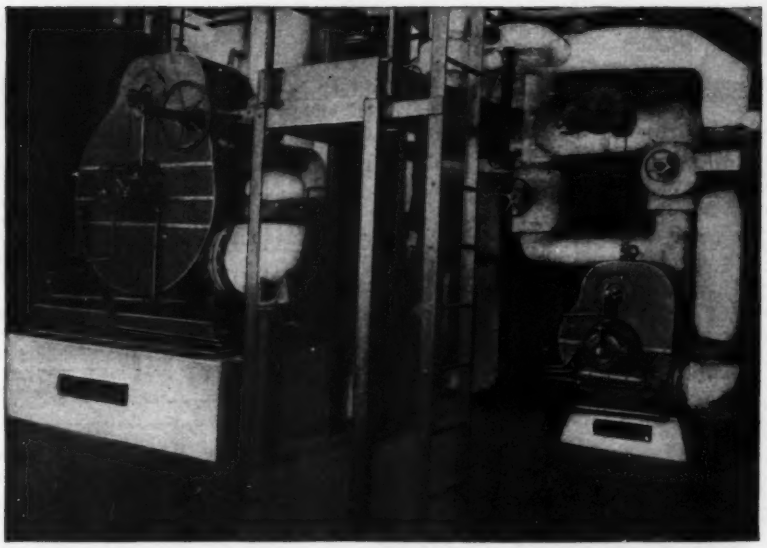
If you use a roll very gently, perhaps only one shift a day, and then at low pressure so that the roll never becomes severely overheated and lasts for years, perhaps twenty or twenty-five years as it does in some cases, that roll will not do the same job of finishing that a new roll will do, simply because it has lost its resiliency.

There is an increasing desire for speed and for higher surfaces. In striving for both of these at the same time, we get a greater heat. The heat, of course, will cause failure of the roll through a charring action. The result is that there is a limiting factor as to how soft we can go in the manufacture of a roll without the introduction of other heat-resisting materials. There has been a lot of work done along that line, but each individual problem calls for a particular discussion.

If we apply the stack to the paper, we get a polishing action or we get a flattening action. If we start with any one sheet (one sheet of fiber, pigment and binder) and run it through a calender stack at one pressure, the amount of action that we get can be considered a direct function of the amount of moisture in the sheet. If we hold the moisture constant and all other things constant except the temperature of the stack, we shall get a different action on the stack and on the final sheet of paper. The control of temperature can be obtained mechanically; although, in most cases, we are still controlling it by the ability of the stack to generate heat within itself.

As far as moisture is concerned, we have to tie that back to the several constituents of the sheet of coated paper. A damp pigment will finish easier than a dry pigment; a damp binder will finish easier than a dry binder; and a damp fiber will finish easier than a dry fiber. So again it is a question of choosing the amount of moisture that we want to use and the various types of fibers and pigments and binders we want to use.

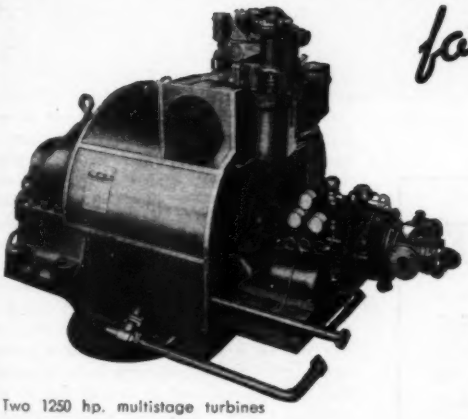
A coating man has got to decide just how he is going to balance all of his several plastic functions to react under a condition (a tool which depends entirely upon



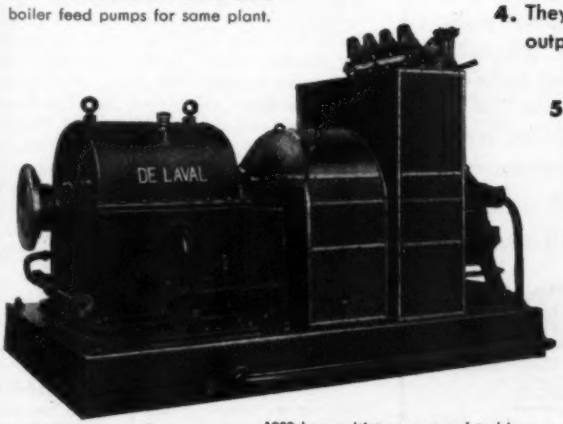
One of three De Laval geared velocity stage turbines driving induced draft fans, using steam at 450 lb. gage and 750° F. and exhausting against 5 lb. gage back pressure; 550 hp. each at 3480 r.p.m. turbine speed and 725 r.p.m. fan speed; also one of three De Laval geared velocity stage turbines driving forced draft fans.

DE LAVAL HIGH EFFICIENCY STEAM DRIVEN AUXILIARIES

for High Rating Boilers



Two 1250 hp. multistage turbines with multi-nozzle control to drive boiler feed pumps for same plant.



1200 hp. multistage geared turbine to drive mechanical draft fans; one of two units for the same plant.

Steam driven boiler room auxiliaries confer valuable advantages.

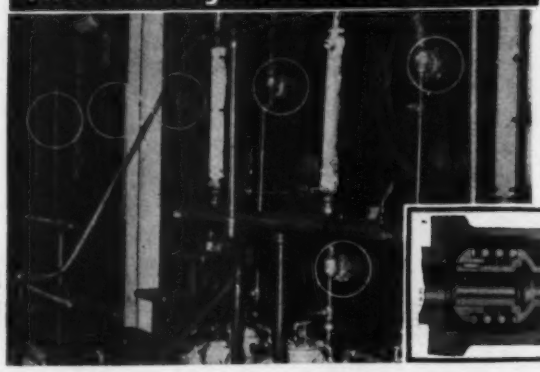
1. They can be operated independently of the main units and of the electrical system, and even on reduced steam pressure.
2. They are reliable, by reason both of their simple, sturdy construction and of their immunity to electrical disturbances.
3. They do not subtract from, and hence are not chargeable with, the capacity of main units, including transformers, switching gear and cables.
4. They can be directly and accurately regulated as to both speed and output. Turbine driven draft fans, for example, do not require supplementary damper regulation.
5. DE LAVAL TURBINE DRIVEN AUXILIARIES are adapted to receive steam directly from the station steam mains and can be designed to operate efficiently in bleeder, back pressure or condensing service. In large plants their efficiency may approximate the overall efficiency, including generators, transformers and motors, of electric driven auxiliaries.
6. The De Laval Double Helical Speed Reducing Gear makes possible the attainment of maximum efficiency in both turbine and driven machine.

These advantages may be best demonstrated by application to a specific case. If you will send data concerning the requirements for auxiliary power in your plant, our engineers will gladly submit suggestions, with estimate, for the most economical layout.

3511

DE LAVAL STEAM TURBINE CO. . . TRENTON, N. J.

These are good stairs — but — THEY WON'T BE NEEDED NOW!



• At least no one will need to climb them for inspecting, packing, oiling and adjusting the stuffing boxes; for this is one of the many paper machines where Johnson Rotary Pressure Joints have ended stuffing box troubles. The sectional view shows the basic construction of these Johnson Joints. Two special, self-lubricating carbon graphite rings form the bearings and pressure seal. Sealed by the pressure, they are self-adjusting. Equally important is the ball and socket design and the annular space around the outlet which provides for angular or lateral misalignment —greatly increasing joint life.

There is a Johnson Joint for every machine with every type of drainage—a joint that will save time, power, and step up production. Ask for latest bulletins.

THE JOHNSON CORPORATION
845 WOOD STREET THREE RIVERS, MICH.

the plastic function of the several constituents of a sheet of coated paper to give the finish) and then to create a condition in a sheet which will not permit the penetration of that finish to the extent that you get transparency in the entire sheet. In other words, we want to create a condition on the surface quite different from that throughout the sheet so we can make a homogeneous mass out of the surface without making a homogeneous mass of the entire sheet.

The Development of Flexible Doctors

F. W. LODDING

In tracing the development of flexible doctors for use on the paper machine, we must go back to the year 1912. Around that time, Mr. John Frossard obtained one of the first U. S. flexible doctor patents. Being a pioneer in his line, he of necessity limited himself to a narrow field and most of his doctors were made for calenders or supercalenders. Mr. Frossard continued to develop his flexible doctor and in 1925 patents were granted to him in this country on an improved doctor mechanism. On approximately the same date, patents also were granted in England on much the same subject. In the following five years, doctor development was in the direction of improving the doctor blade material or the method of fastening the doctor blade so that its utmost flexibility could be utilized.

In June of 1929 the writer, of Worcester, Massachusetts, became convinced that the existing modes of holding flexible doctor blades did not permit obtaining the fullest benefit of that flexibility. In order that a flexible blade might be free to conform to any irregularities of roll surface, he believed that both front and rear edges of the blade should be unconfined. Accordingly, he developed a method of holding a flexible blade in such a manner that both edges were substantially unconfined, and the resulting action of the blade might be well defined as "floating." The writer applied for a patent in 1929 and it was granted in 1932.

The development of doctor blade material has been rapid. To the Formica Insulation Company goes the honor of making the first flexible bakelite doctor blades ever used on a paper machine. In 1929, when stainless steel was unknown for this purpose, we used to furnish regular tempered carbon steel. We then hit upon the idea of cadmium plating the doctor blades but this did not work, as the plating quickly peeled off.

The first stainless steel doctor blade was used by us. It was made .035 in. thick by 2½ in. wide and was produced by the Carpenter Steel Company of Reading, Pennsylvania. This was in the latter part of 1929.

The principal modes of doctor construction may be classified as follows: solid doctors, flexible doctors—securely fastened to supporting members, and floating flexible doctors.

Solid doctors are characterized by thick doctor blades of varying composition fastened to single iron or pipe construction supports. Such doctors were common several years ago, but are being rapidly replaced.

The original flexible doctors never were completely satisfactory on the wet end. They performed fairly well on the dryers, but on the calenders they were indeed a great improvement.

The Lodding floating blade principle represents a large step of development over the original flexible type doctor.

After long search for suitable equipment to oscillate all doctors on a paper machine, we found that the best means was pneumatic power, either air pressure or vacuum, both of which are usually available in all paper mills. By simply connecting to the suction leg of the suction couch or suction press, an entire set of calender or dryer doctors can very readily be operated.

Our problem in designing suitable pneumatic oscillators reduced itself to the proposition of having a unit which would not take up any more space than that of the ordinary doctor. We hit upon what we think was an ingenious idea, namely, using the doctor journals for air cylinders.

We encountered a major problem in designing a valve mechanism which would relay the air or vacuum from one cylinder to the other. Therefore, we had to develop our own valve mechanism. We have, moreover, designed our apparatus in such a way that, should anything go wrong due to an accident, a new unit can be replaced immediately with the machine running.

The old type of solid doctor of either wood or bronze on dryers, rubber or bronze on presses, would consume about 3½ to 4 hp. on the average. This would be on 48 in. diameter dryers and presses about 20 in. in diameter, and the machine would be the average width, that is, at 120 in. or more, or the paper speed would be in the vicinity of 500 f.p.m. The new floating type of doctors consume only about ½ hp., due to much lighter pressure per linear inch, and also due to considerably less resistance against the turning action of the roll.

◆

Chemical Composition of Japanese Beech

This beech (Fagus Sieboldi Endl.) known as "Buna" is used in Japan for producing pulp. The wood contains 0.62 per cent extractives (alcohol benzene), 53.45 per cent total cellulose, 4.95 per cent soluble pentosan, 21.47 per cent lignin, 0.62 per cent ash, 5.87 per cent methoxyl. Y. Uyeda and K. Ohata. Cellulose Ind (Japan) 14, 64 (1938).

FOR HIRE

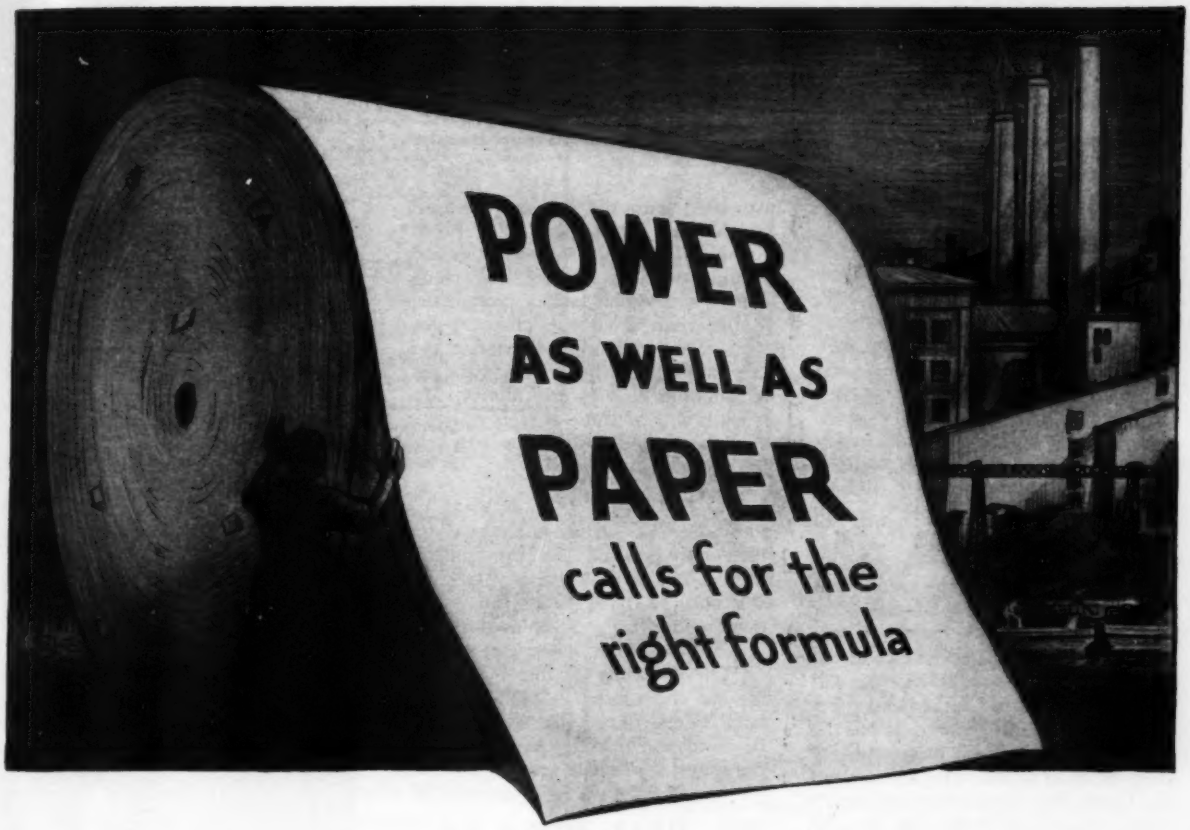
Technically trained paper man (is willing to work without pay) as consultant in progressive paper plants. Has had experience with paper manufacturing problems with over 100 mills. Reason: to give technical service not just sales talk to mills who want to make good products better.

WRITE:

NOPCO TECHNICAL MAN

NOPCO
EVOLVED THRU RESEARCH

National Oil Products Co.
Harrison, New Jersey
Boston • Chicago
Cedartown, Ga. • San Francisco



Admiralty Coal · DEPENDABLE ANTHRACITE · DENDRON · CRITERION COAL · RODA · STONEGA · Old Kentucky · CROZER · PREMIX · GENCO

Mother Nature was the chemist who formulated coal. With her usual lavish hand she created it in many varieties. Modern power engineers have learned that new operating efficiencies and operating profits are the reward when coal of the *right* analysis is employed.

The General Coal Company offers a wide selection of coals, mined in all important producing districts. When a study is made of plant facilities and needs, one or more of these individual brands will be found to afford peak efficiency and economy. With the service convenience offered by the many offices of General Coal . . . no plant owner or operator can afford to overlook this opportunity for greater earnings.

GENERAL COAL COMPANY

PHILADELPHIA, PA.

BOSTON · CHARLOTTE, N. C. · DETROIT · CINCINNATI · NEW YORK · CHARLESTON, S. C. · PITTSBURGH · BUFFALO

GENERAL COAL

PERSONALS

VAUGHAN HEADS MARKETING BODY

Frank P. Vaughan, manager of the Bay West Paper Company, Green Bay, Wisconsin, has resigned his post to accept the position of president and general manager of the newly-organized corporation, "Tested Papers of America, Inc.," with headquarters in Chicago (See Trade Winds). Directors of the company have announced that William J. Servotte, assistant manager for several years, has succeeded Mr. Vaughan as acting manager.

Mr. Vaughan plans to maintain his home in Green Bay for the present and will retain his interest in the Bay West Paper Company to the extent of continuing as treasurer and director of the company. In his new position he will set up the offices in Chicago and select the office personnel, as well as put the machinery of the new merchandising corporation in action. He has managed the Green Bay paper company for 15 years, going there from Fort Howard Paper Company, Green Bay, where he was office manager for several years.

◆

ELECT NICHOLS SECRETARY OF BANTAM BEARINGS

Newly elected secretary of the Bantam Bearings Corporation, South Bend, Indiana, is R. B. Nichols, who has been associated with the bearings business for the past fifteen years. Mr. Nichols' wide experience with bearings and bearing problems comes from long contact with actual factory production, having risen from the ranks to the office of superintendent at Bantam and later having been made sales manager. In addition to his new duties, Mr. Nichols will continue as sales manager of Bantam, the position he has held for the past three years.

R. B. Nichols

◆

▶▶▶ *Ray Aughey,* an employee of the Biron division of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wisconsin, is recovering from a very unusual eye injury received while at work in the mill on July 31 when an insect flew into his eye and caused a blood vessel to burst. It is hoped that his sight can be saved and that he can return from the hospital within a few days.

◆

DR. HALL HEAD OF FORESTRY STATION

Now director of the Central States Forest Experiment Station, Columbus, Ohio, is Dr. J. Alfred Hall, formerly associate director of the California Forest and Range Experiment Station. Dr. Hall succeeds Willis A. Baker, who resigned recently to become chief forester for the Tennessee Valley Authority.

Dr. Hall received his Ph.D. from the University of Wisconsin in 1922 and prior to entering the Forest Service in 1930, had several years of research experience in biochemical investigation. In 1930 he joined the staff of the Forest Products Laboratory to develop biochemical investigations in relation to the production of naval stores from Southern pines. He was made associate director at the California station in 1937.

◆

KELLER NOW VICE PRESIDENT AT CONTAINER

A prominent figure in the paperboard and container industry for many years, Ira C. Keller was recently elected to a vice presidency of the Container Corporation of America, following an action of the board of directors of that company. Mr. Keller's election was recently announced by President Walter P. Paepcke.

Mr. Keller was graduated from Rensselaer Polytechnic Institute and began his business career in 1920 with the Westinghouse Electric and Manufacturing Company. Fourteen years ago, Mr. Keller began his present connection as assistant general superintendent of the Sefton Manufacturing Company, a forerunner of the Container Corporation. In addition to engineering, Mr. Keller became increasingly absorbed in sales work, eventually taking over both responsibilities in one of the Corporation's carton manufacturing divisions. In his new post Mr. Keller will have supervision of sales and manufacturing of six of the company's Illinois, Indiana, and Ohio properties.

Ira C. Keller

◆

▶▶▶ Associated with the Minneapolis office of Batten, Barton, Durstine and Osborn, Inc., for the last seven years, *K. W. Ellis* is now vice president of the advertising company.

◆

▶▶▶ The Abitibi Power and Paper Company has appointed *W. J. Zimmerman* as chief engineer and he has taken up residence in Toronto, where the company's general offices are located. For the past twenty years Mr. Zimmerman has been associated with the Mead Corporation as engineer and chief engineer.

◆

▶▶▶ Associated for the past several years as superintendent with the Mersey Paper Company, Brooklyn, Nova Scotia, *J. F. Dempsey* is now occupying the position of general superintendent.

We design, build, and equip complete new Plants, ready to operate. Our preliminary suggestions are yours without cost or obligation.

The H.K. Ferguson Co.
ENGINEERS AND BUILDERS
CLEVELAND, OHIO — Hanna Building
NEW YORK — 25 West 43rd Street

GEORGE F. HARDY
Consulting Engineer
305-309 Broadway, New York City, N. Y.
Member—Am. Soc. C. E.—Am. Soc. M. E.—Eng. Inst. Can.
Consultation—Reports—Valuations—Estimates—Paper and Pulp Mills—Hydro-Electric and Steam Power Plants—Plans and Specifications

J. W. HEWITT MACHINE CO., Inc.
Neenah, Wisconsin
Builders of
Paper Making Rolls and Special Machinery
Roll Grinding a Specialty

THIS year, the 17th Exposition of Chemical Industries offers you a dramatic pageant of progress made possible by the exhibits of more than three hundred of the most progressive manufacturers in the chemical process and related industries.

Three floors in Grand Central Palace will be required to stage these displays. They will reflect the results of many years of research, and definitely point the trend in practice for the years ahead.

Visit the Chemical Exposition this year. Learn about the new and improved products of value in the paper industry—study their operation and possible advantages to you. Discuss your problems with experienced engineers. Here you will acquire knowledge that will help in your business and will enhance your future progress. You and your associates are cordially invited to this great Exposition.

Management, International Exposition Co.

0433

Mr. Dempsey was formerly connected with the Great Northern Paper Company, Millinocket, Maine, and the St. Regis Paper Company, Deferiet, New York. *T. G. Oliver,* formerly tour boss at Mersey, has succeeded Mr. Dempsey as superintendent and *Harry Christopher,* formerly machine tender, has been promoted to tour boss.

◆

BELLACK SUCCEEDS LATE COL. ROBERTS

R. F. Bellack, formerly vice president of the Fox River Paper Corporation, Appleton, Wisconsin, has been elected executive vice president of the company to succeed Colonel M. E. Roberts who passed away recently (see Necrology). At the same meeting of the board of directors David E. Oberweiser, formerly treasurer, became vice president and W. M. Roberts, formerly secretary, was made secretary-treasurer. E. A. Oberweiser continues as president.

◆

PABCO HONORS SUPERINTENDENT

In honor of his twenty-fifth anniversary with the Paraffine Companies, Inc., James T. Coleman, general plant superintendent of Pabco's plant No. 1, was feted at a luncheon party tendered him recently by executives and employees of the company.

Jas. T. Coleman

Mr. Coleman, who was recently named general superintendent of the plant, had been a master mechanic, plant engineer and assistant general superintendent. He is well known in Emeryville, California, site of the Pabco plant, as a city councilman and president of the school board.

▸▸▸ Now a member of the sales organization of the Bulkley, Dunton Pulp Company of New York is *Milton R. Bailey,* Kalamazoo, Michigan. Mr. Bailey, who will join Bulkley, Dunton's Middle Western organization, has been associated with the American National Bank of Kalamazoo and brings with him a record of able business conduct and a varied experience that will be of value in serving the paper industry of the Midwest.

◆

▸▸▸ *H. H. Simmons,* advertising manager of the Crane Company, Chicago, was promoted recently to manager of advertising and sales promotion to succeed *Russell G. Creviston* who was named to a new position, director of trade relations.

◆

SHAPLEIGH JOINS AMER. DELTHIRNA

Now sales engineer for the American Delthirna Corporation, New York City, is David M. Shapleigh, formerly associated with the Paper Makers Chemical Division of the Hercules Powder Company.

Well qualified to assist in the sales and installation of the Delthirna size units, Mr. Shapleigh was graduated from the University of Maine in 1925, receiving the degree of B. S. in chemical engineering and majoring in pulp and paper chemistry. He entered the paper industry as a chemist and gathered valuable laboratory and mill experience for nine years. For the past four and a half years he has worked entirely on sales and service connected with paper sizing in all its phases. In addition to his association with PMC, Mr. Shapleigh was also formerly connected with the Cherry River Paper Company, Brown Company, Amoskeag Manufacturing Company, American Bewoid Company, and the Dunn Sulphite Paper Company.

◆

▸▸▸ *T. W. Estabrook,* formerly general purchasing agent for Brown Company and Brown Corporation with headquarters at Portland, Maine, has associated himself with Eastern Corporation at South Brewer, Maine.

◆

▸▸▸ Now vice president in charge of sales for the new Standard Oil Company of Nebraska is *John H. Hay,* formerly manager of the Billings (Montana) sales division of the Standard Oil Company of Indiana. *E. A. Tessien,* sales promoter at Billings, succeeded Hay in his former position.

BLAW-KNOX APPOINTS L. E. JOSEPH

Now executive officer in charge of Blaw-Knox Company's Blaw-Knox Division, Pittsburgh, is Lawrence E. Joseph, whose appointment was announced recently. Mr. Joseph succeeds R. F. McCloskey, Sr., a company vice president, who was placed in charge of the development of new products for the entire corporation.

L. E. Joseph

Mr. Joseph, until the first of August, was manager of the National Automatic Tool Company, Richmond, Indiana. Prior to that connection, he was a vice president of the Liggett Spring and Axle Company, and previously was engaged as a consulting engineer.

◆

TWO PROMOTIONS ANNOUNCED BY HERCULES POWDER

Two new appointments have been announced recently by the Hercules Powder Company, Wilmington, Delaware.

W. Ernest Henry, superintendent of Hercules' chemical cotton plant at Hopewell, Virginia, has assumed the duties formerly carried out by Luke H. Sperry, manager, who has been appointed chief engineer of Hercules Powder Company. Mr. Henry entered the chemical cotton industry in 1905 at Hopewell and is thoroughly familiar with the field. He has been active in the development of chemical cotton to its present use as a high quality basic material for plastics, rayon, lacquers, film, paper, and other products.

Mr. Sperry brings to his new posi-

For Savings Specify

DARNELL CASTERS & E-Z ROLL WHEELS

You can save Money, Protect Floors and increase Employee Efficiency by demanding Darnell Dependability.

These precision-made products are built to stand abuse, yet are kind to your floors . . . . . Ask your dealer.

Write for Free Manual.

DARNELL CORPORATION, Ltd.
BOX 4027, STATION B, LONG BEACH, CALIFORNIA
36 North Clinton, Chicago—24 East 22nd, New York
DARNELL CORP. OF CANADA LTD. TORONTO ONT. CANADA

THE PUSEY AND JONES CORPORATION

ESTABLISHED 1848

WILMINGTON, DELAWARE

REBUILT AC MOTORS - 3 PHASE - 60 CYCLE

710 HP G. E. synchronous motor, 720 RPM, 4400/2200/440 volts, type ATI.
650 HP Al. Chalmers synchronous motor, 1200 RPM, 2200/440 volts.
450 HP G. E. squirrel cage motor, 720 RPM, 2300/440 volts, type IK.
315 HP G. E. synchronous motor, 600 RPM, 4000/2200/440 volts, type ATI.
300 HP G. E. slip ring motors, 514 RPM, 4000/2200/440 volts, type MT. (3)
300 HP West. New slip ring motors, 360 RPM, 440/220 volts, type CW. (2)
250 HP G. E. squirrel cage motor, 1800 RPM, 2200/440 volts, type KT550.
250 HP Al. Chalmers squirrel cage motor, 600 RPM, 440/220 volts, type AR.
150 HP G. E. slip ring motor, 450 RPM, 440/220 volts, type IM.
150 HP G. E. synchronous motor, 360 RPM, 440/220 volts, type TBC.

Send For New Illustrated Stock List

CHICAGO ELECTRIC CO. 1324 W. 22nd St., Chicago, Ill.

RYERSON CERTIFIED STEELS

IN STOCK-IMMEDIATE SHIPMENT

When you need steel of any kind, a single bar or a carload, order from the nearest Ryerson plant.

Bars, Shapes	Shafting	Welding Rods	Alloy Steel
Structurals	Tubing	Solder	Tool Steel
Rails, Plates	Boiler Fittings	Stainless Steel	Floor Plates
Sheets—Strip	Concrete Reinforcing	Babbitt Metal	Safety Treads
Rivets, Bolts			

Write for the Ryerson Stock List.

Joseph T. Ryerson & Son, Inc. Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Believe It or Not!

Accidents steal over $1,000,000.00 annually from the paper and pulp industry!

The above almost amazing but quite conservative figure is based on compensation costs alone! All cases and costs included, the total figure is four or five times the cost of compensation. In other words the average total cost of accidents in the paper and pulp industry is about $60.00 per worker per year—equal to the average production cost per ton of paper.

What can be done about it? The National Safety Council has published an interesting little booklet which gives the answer—briefly and concisely. We'll gladly send a copy FREE to any safety director or plant executive on request. Just drop us a line on company letterhead.

PAPER & PULP SECTION

NATIONAL SAFETY COUNCIL
20 NORTH WACKER DRIVE, CHICAGO, ILL.

tion as chief engineer a wide variety of engineering and operating experience gained in the Hercules organization. He joined the company in 1918 as assistant superintendent of the dynamite plant at Hercules, California. Transferred to Emporium, Pennsylvania, in 1922 as superintendent of that plant, he subsequently became superintendent of the company's dynamite plant at Kenvil, New Jersey, and manager of the chemical cotton plant at Hopewell.

◆

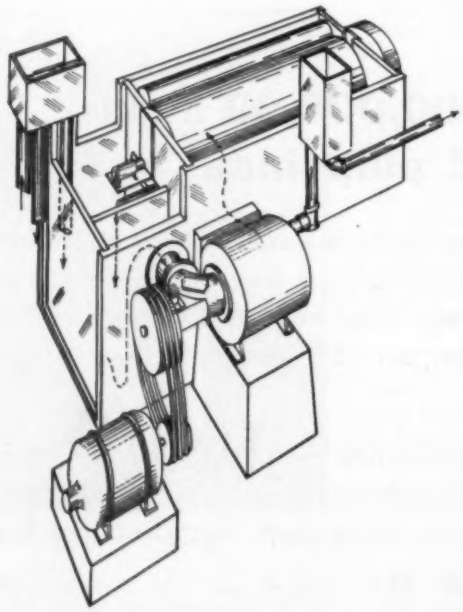
▶▶▶ A REPORT FROM THE McGraw-Hill Book Company shows a total of 1,179 copies of the textbooks on *The Manufacture of Pulp and Paper* sold during the first six months of 1939, with total sales of the five volumes up to date exceeding 31,000 copies.

◆

▶▶▶ THE UNITED STATES PRODUCED 3,479,455 tons of wood pulp during the first six months of 1939, according to revised estimates released by the Forest Products Division of the Department of Commerce. This amounted to a 27 per cent increase over the production in the corresponding first six months of 1938.

Fifty Years of Service

In recognition of his fifty years of service with the Crown Zellerbach Corporation, Otto Erickson (left), 71-year old millwright was recently honored by members and officials of the C-Z organization. Mr. Erickson is shown above receiving a diamond studded service pin from Louis Bloch, chairman of the board of directors. Mr. Erickson began work with the old Willamette Pulp and Paper Co., on August 15, 1889, as a carpenter. He has had a perfect safety record during his half century of service with Crown Zellerbach.



Made in 3 Sizes
25, 50 and 100 Tons

OLD PAPER STOCK

SELECTIVELY SCREENED
to Improve
FINISH, STRENGTH, FOLD

NO PUMPING
NO ADDITIONAL CHESTS
RIFFLERS RECOMMENDED, but not required
AUXILIARY CLEAN UP SCREEN retains good fibres
Unbeaten Flakes SEPARATED by Hydraulic Action—not CUT

TRIMBEY PULP CLASSIFIER

TRIMBEY MACHINE WORKS

GLENS FALLS, N. Y.

WATERBURY FELTS

Are Made By

H. WATERBURY & SONS CO.

ORISKANY, NEW YORK

SWENSON

EVAPORATORS & FILTERS for Pulp Mills

SWENSON EVAPORATOR COMPANY

15653 Lathrop Avenue

Harvey (Chicago Suburb), Ill.

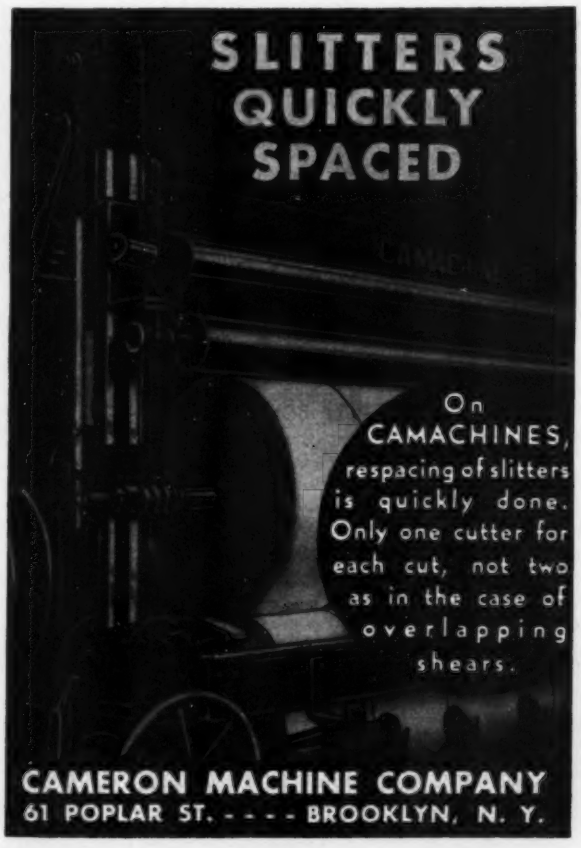
VEST POCKET POWER PLANTS

Small space occupied, any capacity, low over-all operating costs, high and extreme efficiencies, reliability, low initial investment. Complete power plants to meet any operating conditions of Pulp and Paper mills or other Industrial service. Engineering and Construction. Satisfactory Services Always Guaranteed.

FERGUSON ENGINEERS

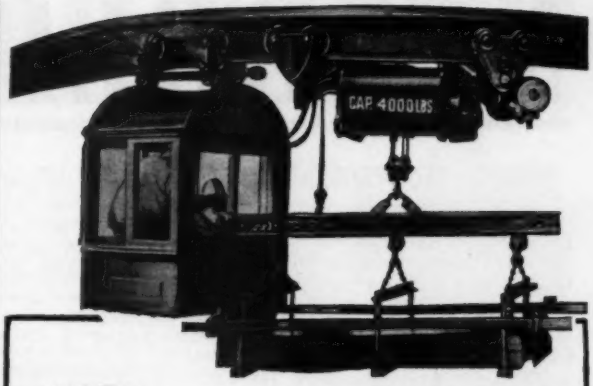
Power Specialists

Monadnock Bldg., Chicago



CAMERON MACHINE COMPANY

61 POPLAR ST. - - - - BROOKLYN, N. Y.



FOR

Extra Long Hauls

choose the

CAB CONTROLLED

A-E-CO LO-HED HOIST

When—1. Hauls are exceptionally long. 2. Many bays must be served. 3. The path under hoist is obstructed. 4. Speed is essential—

The motor trolley, cab controlled A-E-CO Lo-Hed Hoist—motor trolley with cab trailer—is the best to use.

For high-lights of this hoist see A-E-CO POINTS (below). For full details of Lo-Hed hoists, send for our new catalog today.

A-E-CO POINTS

- Lo-Heds range from 1/4 to 12 ton capacities (above type available from 1 to 12 tons).
- Operates on Standard I-beam or track of any make.
- Low headroom — stacks materials higher than any other hoist.
- Safe, fool-proof.
- Compact, strong, simply constructed.
- Protected against dust, moisture, fumes.
- Heavy duty, ball-bearing HOIST SERVICE motors.
- Automatic lowering brake.
- Ball or roller bearings at vital points.
- Improved plow-steel cable.
- 100% positive automatic stop.
- Indoor (open) and Outdoor (glazed) cabs.
- Efficient spur-gear drive . . . and

LO-HED COSTS LESS PER LIFT

AMERICAN ENGINEERING COMPANY

A-E-CO Lo-Hed HOISTS

2444 ARAMINGO AVENUE, PHILADELPHIA, PA.

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS
MARINE DECK AUXILIARIES • HELE-SHAW FLUID POWER

NECROLOGY

FRED A. ROBINSON

To many friends in the industry, particularly those closely associated with him in the Paper and Pulp Section of the National Safety Council, the passing on September 1 of Frederick A. Robinson, of the Kimberly-Clark Corporation, Neenah, Wisconsin, came as a complete shock. He was at his duties during the day, and late that night suffered a sudden attack.

Mr. Robinson was born April 15, 1895, at Ste. St. Marie, Michigan. He attended public schools at Rhinelander, Wisconsin, where he grew up. After graduating from high school, he studied at the University of Chicago.

During the World War, he served overseas with the army medical corps from 1917 to 1919. Since that time, he had been keenly interested in problems of health and safety.

Fred A. Robinson

When quite a young man, Mr. Robinson began his career with the Kimberly-Clark Corporation, and his passing wound up a 23-year service record with the company. He started in the chlorine department of the Kimberly mill January 1, 1916. He served as personnel department superintendent of the Kimberly-Clark Niagara Falls, New York, and Neenah, Wisconsin, mills. For two years he was associated with personnel work with the Spruce Falls Power and Paper Company, Ltd., Kapuskasing, Ontario. Since 1930, he has been in the home office at Neenah as a member of the industrial relations department, serving in charge of employment, health and safety, and other activities throughout the corporation.

Mr. Robinson had been actively interested in the work of the Paper and Pulp Section of the National Safety Council for a number of years. He served as secretary of that body in 1936-1937; was chairman of the program committee for the year 1937-1938; and at the twenty-seventh annual safety congress which met in Chicago last October, Mr. Robinson was elected general chairman of the Paper and Pulp Section. He was to have presided at the next annual congress which will be held in Atlantic City next month, and he had been working earnestly for the success of that meeting.

With the same enthusiasm he held for national affairs, Mr. Robinson was vitally interested in many civic and state matters. He was a member of the American Society of Safety Engineers and also belonged to many local groups. At the time of his passing, he was representative of Wisconsin industry on the Governor's committee to revise state orders concerning industrial health and sanitation.

Surviving Mr. Robinson are his widow, a 10-year old son, his mother and a sister.

◆

FRED W. SUTHERLAND

Fred W. Sutherland, executive vice president and secretary of the Sutherland Paper Company, Kalamazoo, Michigan, and one of the most successful executives in the paperboard industry, passed away in Kalamazoo on August 10, following an illness of several weeks. He was 51 years old.

Mr. Sutherland was born near Kalamazoo on January 11, 1888, and became connected with the paper industry at an early age, beginning work with the Bryant Paper Company of Kalamazoo as assistant in the purchasing department. It was at this company that Mr. Sutherland received the background which later enabled him to join his brother, Louis Sutherland, president of the Sutherland organization, in building a successful paper mill business. The Sutherland Paper Company began as the Kalamazoo Sanitary Carton Company in 1917. Its name was soon changed to the Sutherland Paper Company and the brothers, Fred and Louis, steadily guided the organization to an important place in the industry.

Fred W. Sutherland

In 1928 the Sutherland Paper Company acquired the Standard Paper Company of Kalamazoo and under Fred Sutherland's guidance, three paper machines were completely overhauled and rebuilt, this development being followed by the company's entry into the paper specialty field—a line which grew so rapidly that a new $200,000 factory building for specialty items was completed just before his demise.

Through these years of the company's speedy development Fred and Louis Sutherland worked as one. Fred Sutherland played a prominent role in the civic development of Kalamazoo and was a member of many financial and fraternal organizations. Surviving him are his widow, two daughters, his mother, and a brother and a sister.

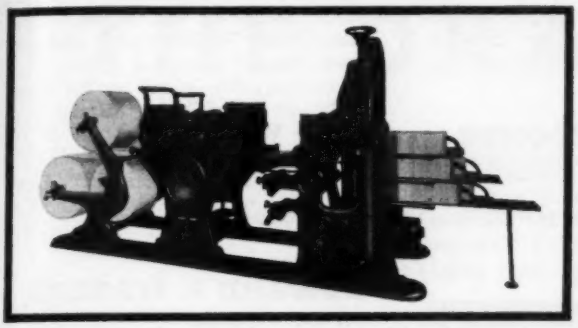
◆

COL. M. E. ROBERTS

Colonel Merritt E. Roberts, executive vice president of the newly-formed Fox River Paper Corporation, Appleton, Wisconsin, passed away August 13 in Philadelphia, Pennsylvania, while on a trip East. He was 56 years of age.

A native of Wisconsin, Colonel Roberts was born in Marinette in 1883. Following a short time in the West, he enlisted in the United States Army, becoming a captain in 1908. He left the army that year but re-enlisted during the World War, serving as colonel with the military intelligence section in France. Following the war, the colonel became affiliated with the Underwood Typewriter Company and later became western sales manager of the Remington Typewriter Company. From 1928 to 1936 he was general sales manager of the A. B. Dick Company of Chicago, resigning in the latter year

HIGH SPEED



NAPKIN FOLDER

It makes them all — plain, embossed and printed — quarter fold, dispenser fold, sixteenth fold and eighth fold. From 1,000 to 2,000 per minute — every napkin perfectly folded and delivered in a smooth, clean pack ready for wrapping. Used by every large producer in the United States and many foreign countries.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS

PARIS BLACKS

DIXIE AND KOSMOS
PARIS BLACKS

Blacks known for their tone, strength and miscibility. They assure smooth, unvarying shades that last.

UNITED
CARBON COMPANY
CHARLESTON, W. VIRGINIA

LOW COST

Installation and Maintenance, High Efficiency Performance, Long Life of Service.

• You place a Stickle Series 100 Trap into a line in the simplest and most obvious way. Straight-in-line design, built-in by-pass, internal disc strainer save labor and materials cost in installation. Absence of toggles, levers, or hinges makes for trouble-free operation. Automatic regrinding of valve and valve seat keeps efficiency at high point indefinitely. If you want steam-trap efficiency and dependability at reasonable cost—Stickle Series 100 will meet your requirements.

STICKLE SERIES 100
4 SIZES

Here's the Story . . .

YOU SAVE piping, fittings and labor. Extra piping, unions and elbows the old way (left). Simple piping connections the Stickle 100 way (right).
YOU SAVE building by pass. Quarter turn of nut in top of Stickle 100 (at right) allows Built-in By-Pass to operate.
YOU SAVE strainer when you install Stickle 100 (at right) with its Internal Disc Strainer.
Also YOU SAVE maintenance. Rotation of bucket automatically regrinds valve of Stickle 100. No scoring or wire drawing.
And YOU SAVE on repair parts. No levers or hinges. Inspection of valve and seat without removing Stickle 100 from line.

Ask for Bulletin and Prices

STICKLE
STEAM SPECIALTIES COMPANY
2225 Valley Ave., Indianapolis, Ind.

NAYLOR
Lockseam Spiralweld
PIPE

FORGET
LINE JITTERS
with NAYLOR
Vibration-Proof PIPE

Here's the one light-weight pipe that will effectively cushion line vibration, cut maintenance cost to the bone and save you money. Naylor's exclusive Lockseam Spiralweld structure acts as a continuous expansion joint. Absorbs vibration and shock loads. Gives you greater strength, flexibility, safety and performance economy. Sizes 4" to 30" in diameter with all type fittings and connections. Complete fabrication service.

WRITE FOR CATALOG NO. 37

NAYLOR
PIPE COMPANY
1236 EAST 92nd STREET
CHICAGO, ILLINOIS

because of ill health. Colonel Roberts came to Appleton in August 1938, as an incorporator of the Fox River Paper Corporation which took over the Fox River Paper Company. He is survived by his widow and one son, William, secretary of the Fox River Paper Corp.

◆

JOHN R. BOOHER

Well known in industrial and equipment circles, John R. Booher, advertising manager of the Cleveland Crane and Engineering Company, Wickliffe, Ohio, passed away August

John R. Booher

15 at the age of 61. He had been associated with the Cleveland Crane and Engineering Company in an advertising capacity for the past seventeen years.

Prior to his affiliation with the Cleveland Crane and Engineering Company, Mr. Booher had been connected with the Luetkemeyer Company, Pittsburgh; the Doubleday Hill Electric Company, Pittsburgh; the Western Electric Company, Pittsburgh and Cleveland, and the Cuyahoga Power and Construction Company.

◆

MRS. G. W. MEAD

Mrs. George W. Mead, a daughter of the late Jere D. Witter, pioneer Wisconsin paper mill industrialist, and wife of George W. Mead, president of the Consolidated Water Power and Paper Company, passed away August 24 after a long illness. Although Mrs. Mead had been in failing health for several months, her passing came as a great shock to her many friends in the community and throughout the state.

Mrs. Mead was actively engaged in charity work and was a life-long member of the Congregational Church. She was one of the early members of the Daughters of the American Revlution, in addition to her affiliation with the P.E.O. Sisterhood, the Travel Class, Miami Beach Women's Club and the Miami Beach recreational clubs.

Surviving Mrs. Mead are her husband, and her children, Stanton W. Mead of Wisconsin Rapids and Walter L. Mead of Chicago, both officials of the Consolidated organization. One daughter, a brother, and a sister also survive.

◆

EDWARD S. WAGNER

Associated with the Scott Paper Company, Chester, Pennsylvania, for the past 27 years, Edward S. Wagner, first vice president and treasurer of the company, passed away August 15 at the age of 48.

Mr. Wagner started with the Scott Paper Company as an assistant in the accounting department in 1912. He became in succession director, treasurer and in 1927, first vice president. He was active in the management of the company until the time of his passing. In addition to his offices in the Scott Paper Company, Mr. Wagner was a director in the Brunswick Pulp and Paper Company, Timberlands, Inc., Nova Scotia Wood Pulp and Paper Company, and the Delaware County National Bank. He was a graduate of

Edward S. Wagner

the University of Pennsylvania and was a member of the Union League, Penn Athletic Club, Sunday Breakfast Club and the Philadelphia Country Club. His home was in Merion, Pennsylvania.

Surviving Mr. Wagner are his widow, a daughter, his mother, one brother, and four sisters.

THE DRAPER FELT

Unexcelled for strength, openness, resiliency, and general running qualities. Made to meet the most exacting conditions on all types of machines and all kinds of papers. Only one grade and that the highest.

Made by

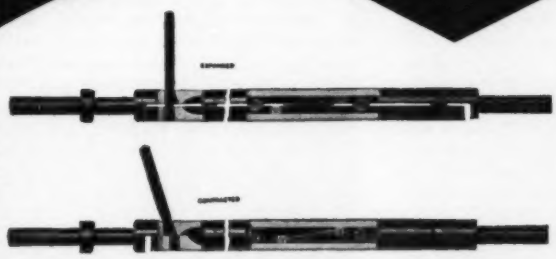
DRAPER BROTHERS COMPANY
CANTON, MASS.

Woolen Manufacturers Since 1856

REPRESENTATIVES

L. H. BREYFOGLE, Kalamazoo, Mich.
W. L. CAMPBELL, Savannah, Ga.
C. K. BEECHER, Delaware, Ohio
O. J. LELOFF, Vancouver, Wash.

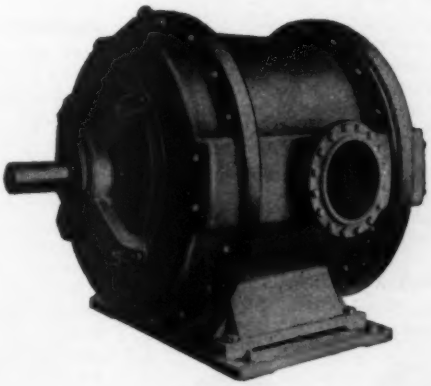
SOLID STEEL WINDER SHAFTS



Shown here in both expanded and contracted positions, Murray Collapsible Winder Shafts have been made for over 20 years. They are easily inserted or removed from the rolls—no sticking or breaking of shafts. Designed to operate freely . . . accurately machined for smoothness and ease of operation . . . will stand abuse and give maximum service . . . made to individual paper machine specifications, to meet individual conditions and in all diameters for any size and width of roll desired. Send us your specifications for quotations.

D. J. Murray Mfg. Co.
WAUSAU ~ WISCONSIN.

ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES



One Moving Element. Non-pulsating Vacuum. No Internal Wearing Parts. No Internal Lubrication. Handles Liquid With Air. No Expert Attendance. Constant Efficiency. Low Maintenance Cost.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW EQUIPMENT AND SUPPLIES

Pocket Size CO_2 Indicator

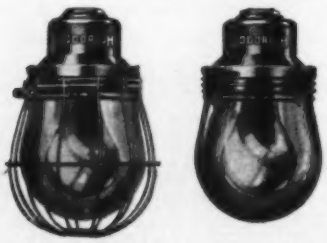
Bacharach Industrial Instrument Company, Pittsburgh, has announced a pocket size CO_2 indicator, trade named *Fyrite*. The instrument is furnished complete with aspirator bulb, filter, rubber tubing and metal sampling tube, all packed in carrying case which also has room for a Bacharach Draftrite gauge and a pencil type stack thermometer. The whole kit weighs four pounds and measures 8½x7x3¾ inches.

A dozen strokes of the aspirator bulb fill the Pyrite gas chamber with the flue gas to be analyzed. The sampling hose then is detached, an operation which automatically seals the Fyrite and makes it ready for the analysis. To mix the gas with the absorption fluid, the Fyrite is turned upside down, then back again to its normal position. The suction created, due to the complete absorption of the CO_2, pulls the absorbing fluid up in the graduated tube an amount equal to the CO_2 absorbed. Consequently, its level shows the percentage of CO_2 in the gas.

According to the manufacturer, the entire operation, including the pumping of the gas, takes less than a minute; also the absorbing fluid is good for several hundred readings before it needs replacement.

Lighting Fixture

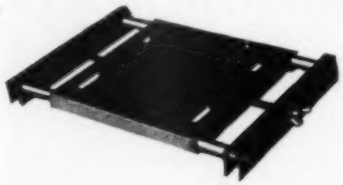
Goodrich Electric Company, 2900 North Oakley Avenue, Chicago, has developed a



lighting fixture that is dustproof, moisture-proof and weather-proof. It is offered in sizes to accommodate lamp sizes from 25 to 150 watts. The fixture, with a one-piece copper hood, may be fitted with a heat-resisting daylight blue, ruby or diffusing globe, or with a clear globe which is standard. It also is equipped with a resilient socket which is easily removed for wiring. The Underwriters' Laboratory has approved the fixture for use in Class II, Group G, hazardous location where combustible dust is, or is likely to be, suspended in the air in sufficient quantities to produce explosive mixtures, for use in Class III and Class IV locations where fibers and materials producing combustible particles are manufactured, handled, or stored, and for use in locations where combustible dust collects in quantity on fixtures and is likely to cause overheating.

Spring Tension Motor Base

Ideal Commutator Dresser Company, 4162 Park Avenue, Sycamore, Ill., has announced a motor base that maintains belt tension through the action of steel springs. Spring



tension holds the motor, takes up slack, and cushions load shock. There also is an adjusting screw to take up belt slack due to normal wear and stretch. A sliding plate serves as a mounting for the motor. The base, constructed throughout of steel, is designated as the *Automatic*.

Turbine-Type Mixer

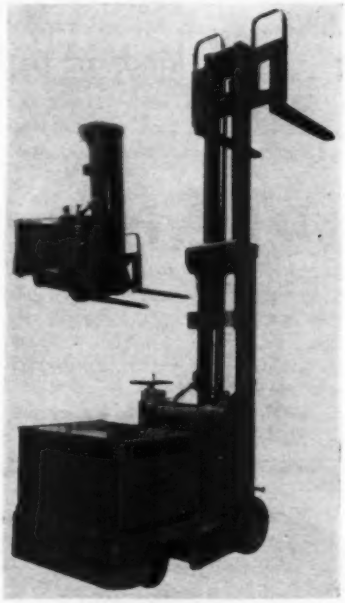
An agitator unit, designated as the *H-R Super-Turbine Mixer*, has been developed by the Hendrick Manufacturing Company, Carbondale, Pa. This unit consists of a turbine agitator element underhung and overhung by stationary rings. The rotor-faced surfaces of the ring members bear radial ridges or ribs which are removed by small clearances from the blades of the turbine element; while the blades of the turbine element are set on both sides of a circular plate member.

In the operation of the unit, the charge being agitated is brought to the turbine element by means of its pumping action. To reach the turbine, the charge passes through the impeller inlets. It then is expelled centrifugally by the turbine, but during its passage between the rotor and stator members it is subjected to direct mechanical shearing between the ridges of the stator members and the rotor blades.

Center Control, Fork-type Truck

A center control, fork-type truck of 6000-lb. capacity has been announced by Elwell-Parker Electric Company, Cleveland. This truck, designated as F-16, is built either as a telescoping or non-telescoping unit. It may be fitted with a fork of two prongs or with a single or double ram. Forks and rams are made of various lengths and spacings to accommodate loads. The operator's station affords him unobstructed vision of the fork tips when load is being picked up or placed.

The frame is a box-like formed plate of welded construction and with fixed full floating axle and non-steered wheels fitted with solid rubber tires. The trail or rear axle carries frame on a spring system.



The trail axle wheels, each fitted with two solid rubber tires, are steered.

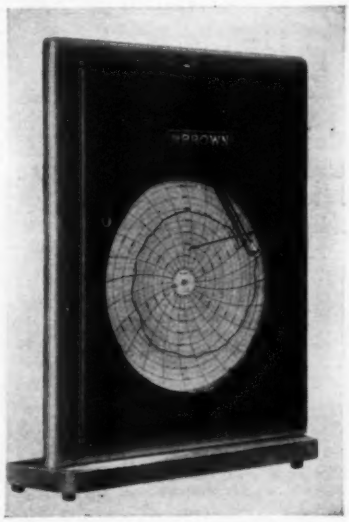
The fork hoist is fitted with slip clutch for protection against excessive overloads or accidental thrust of load forks under immovable loads; while an overrun ratchet device protects hoist and chains if load forks are lowered against obstruction. In addition, an electro-mechanical brake holds the load at will of operator; and hoist generator motor is designed to provide for regenerative function of returning electric current to battery when lowering loads from stacks.

Truck may be fitted with interchangeable lead or alkaline battery, or gas-electric unit as power source.

Temperature and Pressure Recorders

A new and improved line of temperature and pressure recorders, indicators and controllers has been placed on the market by The Brown Instrument Company, Wayne and Roberts Avenues, Philadelphia, Pa. These instruments include indicating and recording types of thermometers for temperatures from –40 deg. Fahr, up to 1200 deg. Fahr., indicating or recording pressure gauges for ranges from 6 lb. of water up to 2500 lb. per square inch, and indicating or recording vacuum gauges for ranges of 10 inches of mercury and over. All types are

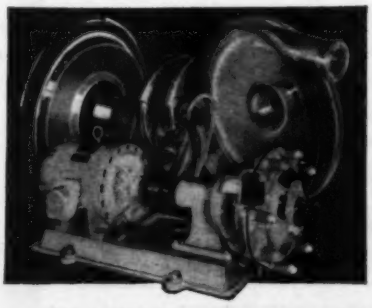
offered in one, two or three pen models. Among the features cited by the manufacturer for each of these instruments are: streamlined rectangular case, styled by Henry Dreyfuss; flat, spiral actuating element with exceptional over-range capacity; chart firmly secured to driving mechanism by tapered



stud and tapered chart positioning stud; friction clutch for chart resetting; pen shaft unaffected by vibration; pen arm easily removed and replaced; resilient mounting; and adaptor block designed to permit easy removal of actuating element for replacement or change of range.

Pump of Glass

A centrifugal pump with impeller and casing of Pyrex heat and shock-resisting glass has been announced by the Nash Engineering Company, South Norwalk, Conn. This pump, conceived by the Corning Glass Works, was designed and is manufactured by the Nash Engineering Company. According to the manufacturer, the pump has the mechanical advantages of metal and the chemical advantages of glass. The manufac-



turer also states that the pump impeller and casing are not affected by temperatures up to 150 deg. Fahr. in standard design, and 200 deg. Fahr. in special design; that the material being handled, because of the transparent casing, is subject to examination at all times; and that dangerous pressure, if for any reason it should develop within the pump, is relieved automatically before it builds up to a point where there would be danger of fracture of the glass casing itself.

Clutch and Clutch-Brake Combination

A magnetic clutch and a magnetic clutch-brake combination, designated respectively as Style F and Style FF, have been announced by Stearns Magnetic Manufactur-

ing Company, Milwaukee, Wis. These devices, designed to fit into small areas, are made in a variety of combinations and sizes. They can be supplied with the collector rings on the hub or on the body, whichever is desired.

Two A-C. Welders

Marquette Manufacturing Company, Minneapolis, has announced two new a-c. welders, one designated as model 400 BT; the other, as model 300 BT.

The first of these two units has a range from 30 to 350 amperes inclusive. It also has a separate tap for each of 19 heat stages. This welder is listed under Re-examination Service of Underwriters' Laboratories, Inc.

The 300 BT welder, listed by Underwriters' Laboratories, Inc., has a range from 20 to 250 amperes inclusive. The truck upon which it is mounted is designed for use where quick mobility is important. All four wheels have roller bearings and are Alemite-equipped. Handle and pivot bearings are Oilite-equipped.

PAPER MILL OFFICIALS

LIKE

Purves Wires*

BECAUSE:

They satisfy machine tenders, superintendents, and purchasing departments.

They make for profits by keeping wire costs down.

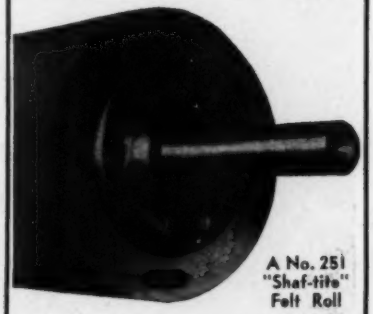
Purves Machine Wire Co. Inc.

HOLYOKE, MASS.

*Wires with a patented non-crack selvage.

"SHAF-TITE"

FELT ROLLS THAT WILL SAVE MONEY AND TROUBLE



A No. 251 "Shaf-tite" Felt Roll

• *Write today*

for prices and proof of "Shaf-tite" superiority. More strength due to patented shaft anchorage. Light, easy to handle, with special rot-resisting surface . . . ROHUNTEX treated.

RODNEY HUNT MACHINE COMPANY

38 Maple St., Orange, Mass.

PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Means for Removing and Replacing Knives of Paper Cutting Machines

Patent No. 2,146,837. Emil L. Mueller, Rutherford, N. J. Application March 30, 1935, Serial No. 13,827. 7 Claims. (Cl. 254—100). A device of the class described for assembling and demounting a knife with relation to the knife plate and clamp bar of a paper cutting machine of the type having a feeding bed intersecting the vertical cutting plane, said device comprising a base adapted to rest upon and slide across said bed under the knife plate and clamp bar, and a pair of vertically movable supporting means mounted as a unitary structure with said base and adapted to receive the knife and carry it selectively toward and away from the vertical cutting plane.

Composite Sheet

Patent No. 2,148,176. Leslie R. Schroeder, South Hadley, Mass., assignor to American Tissue Mills, Holyoke, Mass., a corporation of Massachusetts. Application December 28, 1937, Serial No. 182,050. 1 Claim. (Cl. 154—55). As a new article of manufacture, a composite sheet comprising in combination, a corrugated member having alternate hills and valleys disposed transversely thereof, a sheet secured thereto having relatively flat portions thereof on sets of adjacent hills, the said sheet being relatively longer than a given length of said member with portions thereof between the said flat portions extending downwardly into and conforming to the valleys between the adjacent hills of adjacent sets thereof.

Art of Sizing Paper

Patent No. 2,136,110. Gerould T. Lane and Ralph W. Peters, Rochester, N. Y., assignors, by mesne assignments, to Eastman Kodak Company, Jersey City, N. J., a corporation of New Jersey. Application April 14, 1936, Serial No. 74,343. 13 Claims. (Cl. 92—21). The process which comprises treating pulp before formation into a paper sheet with a vinyl aliphatic acetal resin soluble in water at below 5° C.

Roll Finishing Device

Patent No. 2,144,686. George Wilkins Owens, Tyrone, Pa., assignor to West Virginia Pulp & Paper Company, New York, N. Y., a corporation of Delaware. Application December 12, 1935, Serial No. 54,015. 3 Claims. (Cl. 93—2). A device for finishing the paper wrappings on the ends of a hollow cored paper roll, said device comprising a shaft adapted to be inserted within the core, and an expansible clamping unit carried by one end of the shaft for clamping the same within the core, a press plate carried by said shaft and movable thereon, a rotatable hub on the other end of said shaft, means for translating rotation of said hub into core engaging expansion of said clamping unit and means whereby continued rotation of the hub forces the plate against the end of said roll to compress and clamp the end wrappings thereon.

Covering for Dandy Rolls, Cylindrical Molds, or the Like for Use in Paper Making Machines

Patent No. 2,149,649. Nelson W. Webb, Belleville, N. J., assignor to Eastwood-Nealley Corporation, Belleville, N. J., a corporation of New Jersey. Application August 16, 1935, Serial No. 36,448. 1 Claim. (Cl. 92—48). In a dandy roll, cylindrical mold, or the like, a cylindrical wire supporting surface, a woven wire covering therefor, comprising a length of woven wire fiabric, having its ends disposed in opposed relation along a line parellel to the axis of said supporting surface and circumferentially butted and joined by fusion with a solder strip disposed between said opposed ends and also engaged and fused with said supporting surface, the seam formed thereby being entirely below the cylindrical surface of said covering fabric and constituting a common connection between the opposed ends of said fabric and between said covering and said supporting surface.

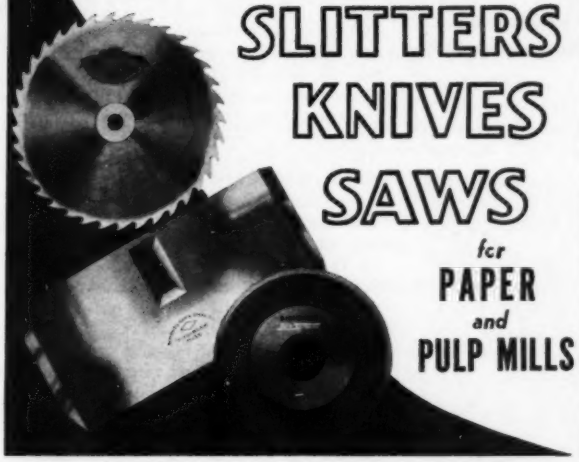
KEEP YOUR FILTERS IN GOOD CONDITION
YOU can expect Norwood Filters to give you the maximum in long, efficient service . . . but all filters should be frequently checked and action taken to get the best service out of them by keeping them in condition. If you need new sand and gravel, new strainers, new controls, or additions and alterations, let us work with you.
THE NORWOOD ENGINEERING COMPANY
16 NO. MAPLE STREET :: FLORENCE, MASS.
A GOOD START AND A GOOD FINISH WITH
NORWOOD
DEPENDABLE WATER FILTERS AND PAPER FINISHING MACHINERY

SIMONDS

SLITTERS
KNIVES
SAWS

for

PAPER
and
PULP MILLS



Write nearest branch for details and prices on highest quality, smooth cutting Chipper Knives, Paper Cutter Knives, Circular Saws, Slitters and Cutters.

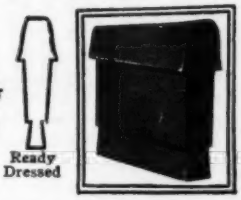
Simonds Saw and Steel Co.
Fitchburg, Mass.

1350 Columbia Rd. Boston, Mass. | 127 So. Green St. Chicago, Ill. | 311 S.W. First Ave. Portland, Ore.

"READY DRESSED" **MILL COGS**

LABOR SAVING—TIME SAVING

THE MOST ECONOMICAL FILLING THAT CAN BE PUT IN A MORTISE WHEEL



Ready Dressed

Blank Head

WE MAKE ANY STYLE OR SIZE WANTED

WRITE FOR INSTRUCTION SHEET "O" WHICH IS FREE

QUICK SERVICE ON ALL SIZES

THE N. P. BOWSHER CO., South Bend, Ind.

Pulp and Paper Mill Screens

of STAINLESS STEEL—COPPER—BRONZE—MONEL—CHEMICAL RESISTING ALLOYS

Perforations that are accurate in size and alignment
ANY METAL ANY PERFORATION

The Harrington & King PERFORATING CO.

5654 Fillmore St., Chicago, Ill., ◆114 Liberty St., New York, N.Y.

Now **PRODUCTION SPEED ON STRAPPING JOBS**

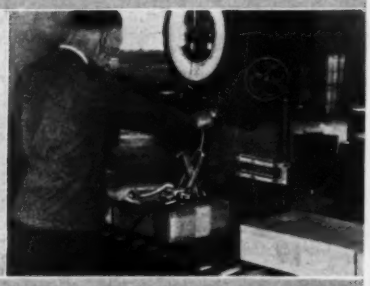
Stanley Steel Strapping speeds shipments, lightens containers, releases men for other jobs. And now it swings into full production speed, with new Stanley Accessories, used with the New "Ace" Strapping Tool.

NEW STANLEY ACCESSORIES FOR FAST PRODUCTION WORK

COIL HOLDER has tray for holding "Ace" tool, tray for seal-clips and coil holder. Move unit wherever you wish.

SHINGLES . . . in bundles quickly strapped into convenient shipping units. "Adjustable Strapping Table Support" holds bundle; "Mechanical Arm" holds tool.

"MECHANICAL ARM" Tool Support. Holds Stanley "Ace" Tool ready, above or at side of work. May be attached to Strapping Table or to a roller conveyor.



HARDWARE . . . keeping pace with rapid conveyor delivery, the "Ace" and Stanley Strapping reinforce these cartons of heavy hardware for safe shipment.

NEW STANLEY "ACE" STRAPPING TOOL
Tightens -- Cuts -- Seals Strapping in A Few Seconds - Feeds Own Seals

Contains 100 seals. Spring-fed, so it operates in any position. One lever tensions strapping, other cuts strapping, feeds seal, crimps seal in one action. Weighs only 10 lb. 3 oz. Simple – a beginner can "make time" from the start.

Let Stanley Engineers adapt the "Ace" and Accessories to your needs, or design new ones to meet special problems. Write today for descriptive literature or ask for demonstration. The Stanley Works, Steel Strapping Div., 142 Lake St., New Britain, Conn.

STANLEY STRAPPING SYSTEM

TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Skeletal Ash Forms of Impregnated Paper

When various papers or cellulosic raw materials are cautiously impregnated with salts under standard conditions and then ashed certain characteristic forms remain. For example, in mechanical or chemical pulp derived from fir, spruce, pine, and aspen, the reinforced ash still retains characteristics which show not only the source of the pulp but which furnish some evidence of its pretreatment. The same is true for paper. In general, the Czapla method (Faserforschung VIII, vol. 4, 1930) was used. The small paper or pulp sheet or the fabric was treated with a small amount of a solution containing (in 100 cc. H_2O) 16 g. thorium nitrate and 0.4 g. cerium nitrate, for 5-10 minutes. It was then removed,

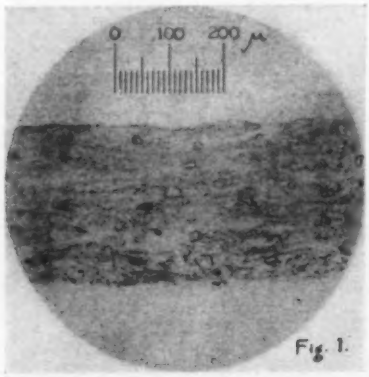


Fig. 1.

placed to drain on a thick S. and S. filter paper (ordinarily used for spot tests) and then removed and cautiously ignited on a platinum sheet by use of a microburner. The ash obtained in this way is not fragile and may generally be mounted by embedding in Canada-balsam-xylol, or in other embedding materials. The author gives

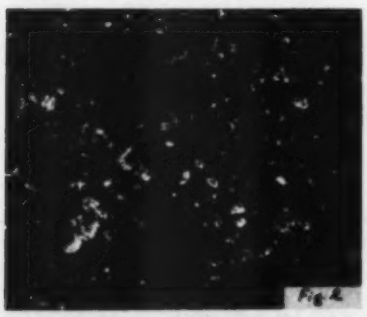


Fig. 2.

some of the characteristics of such ash pictures, in descriptive tabulated form. These also include the results of ashing cotton, linen, and straw-pulp. Interesting photomicrographs are given, a few of which are reproduced here. For example, Figure 1 shows the particles of ground gypsum in the ash of a paper in which this was used

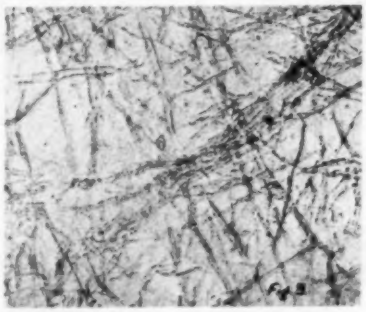


Fig. 3

as loading material. Here the embedding medium was methyl salicylate (magnification 105 diams.). The same ash viewed with crossed Nicols by polarized light (X 80 diams.) is shown in Figure 2. Here the ground gypsum is very clearly visible. In Figure 3 the ash of an impregnated handmade Japanese paper clearly shows the form of the original fibers. The method is not recommended in the case of animal tissues. Alois Herzog, Wochbl. Papierfabr. 70, No. 30, Tech. Tl. 661-4 (1939).

Lignin and Humin

"Lignin" refers to certain portions of the cell walls of lignified plants, while the term "humin" refers solely to the condensation products of the carbohydrates through the action of acids. The author takes up the various approaches to the constitution of lignin that have been attempted during the past few years, in a comprehensive literature survey, as well as the fluctuating analytical data, which indicate that relatively mild pretreatment of wood or straw lead to fluctuating lignin values. In an experiment by the author, 20.72 grams of straw (18.89 grams bone dry) when heated successively for 1, 4 and 7 hours with 700 cc. water and then with two 700 cc. portions of 1 per cent HCl (for 4 hours each), and finally with 700 cc. of water for 4 hours (all at the boiling point of the solvent), the residue is then only 56.8 per cent by weight of the original straw and contains 28.0 per cent lignin. Referred back to the original this means 15.9 per cent lignin, and a loss of 8.3 per cent lignin. This may be in part humin, since, on treatment of levulose with HCl, appreciable amount of humin is formed. However when the following procedure was employed, no noticeable humin formation resulted. Extracted spruce wood (A); beech wood (B) and water extracted wheat straw (C) gave originally 29.3; 15.25; and 15.9 per cent lignin respectively (by the 72% H_2SO_4 method). (A), (B) and (C) were then chlorinated and the percentage of chlorolignins determined. These were respectively 15.4 per cent, 7.1 per cent, and 11.4 per cent. Correcting for chlorine, the actual lignin yields were 11.2 per cent for (A); 5.4 per cent for (B) and 8.1 per cent for (C). It appears therefore that more than half of the so-called "lignin" is actually a humin-substance. A rather comprehensive study was also made of the action of 72 per cent sulphuric acid and various strengths of HCl (under varying conditions) on levulose, and furfural. The maximum yield from levulose was 49 per cent, and that from furfural 83.5 per cent. The highest from glucose when treated with 38 per cent HCl was 37.5 per cent. The composition of such humins is discussed, and the levulose humins show a surprising similarity in percentage composition to the lignins isolated from spruce and beech (especially where dehydration has not proceeded too far). Nitrohumins and nitrolignins were also studied. They were prepared by alcoholic nitration and all contain ethoxyl groups and nitro groups. In a summary, the author points out that this type of nitration of levulose and furfural humins on the one hand, and of beech and spruce on the other, give rather similar products. They are all partly soluble in ether. The nitrohumins and lignins are soluble in NaOH (with a dark red coloration) and give HCN when acidified. This is at least an indication of oximes (although not rigorous proof). This relationship between the humins and lignin should stimulate further research. O. A. Miller, Papier-Fabr. 37. Tech-Wiss. Tl. 184-8; 221-6 (1939).

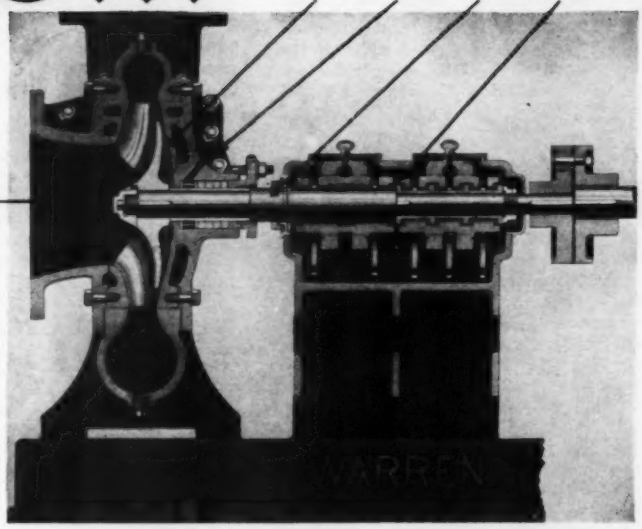
The third communication on this subject shows the rather striking resemblance between chloro-humins (from levulose and glucose) on the one hand and chlorolignins isolated from spruce, beech, and wheat straws on the other. Both are obtained on chlorination. The analytical data, given in great detail (and referred back to the original) show differences, which however are not very great. They seem to involve largely the alkyl group in the chlorolignins, which are absent from chlorohumins. O. A. Miller, Papier-Fabr. 37, Tech-Wiss. Tl. 237-40 (1939).

Cellulose Xanthogenates

Sufficient evidence for the macromolecular structure of the colloidal particles of cellulose xanthogenate solutions has actually been lacking up to the present. Cellulose xanthogenates are heteropolar molecular colloids. To gain evidence regarding their macromolecular structure, the xanthogenates must be converted into polymeranalogous derivatives the structure of which can be determined. Hence xanthogenates derived from cellulose of varying degrees of polymerization were reconverted into cellulose by saponification. These cellulose fractions were then dissolved in cuprammonium hydroxide, and the viscosities determined. The experiments were carried out with two xanthogenates, one with a xanthogenate group for every three glucose residues, and one with a xanthogenate group for each glucose residue. The measurements showed that the xanthogenates through saponification with sulphuric acid

POINTERS

on Pumping Heavy Stock for Less Money



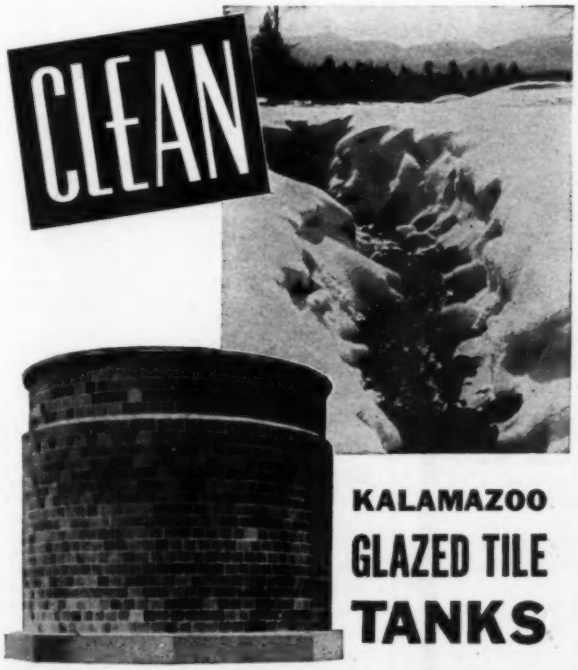
1. Self-cleaning, non-binding impeller in Warren stock pumps prevents stock from working behind impeller and binding the pump.
2. Rotating element can be removed without disturbing suction or discharge piping.
3. Extra heavy shaft prevents vibration and deflection.
4. Oversize bearings assure low bearing pressures, minimize wear.
5. Large inlet insures heavy stock reaching the impeller.

In these—and all other details—Warren stock pumps are built to fit the job.

Check with Warren on your next pump installation.

WARREN PUMPS

WARREN STEAM PUMP COMPANY • WARREN, MASSACHUSETTS



KALAMAZOO GLAZED TILE TANKS

Their bright glistening surface can be kept absolutely clean by a few minutes wash down with a hose—no slime, no concrete chips. Impervious to the action of ordinary stock fluids.

Manufacturers of wood tanks for 60 years.

GLAZED TILE — KALAMAZOO TANK & SILO CO. — WOOD
KALAMAZOO MICHIGAN

ADVANCE BAG & PAPER COMPANY
HOWLAND, MAINE

Plant and Equipment For Sale

75 ton Sulphate Mill

1—100" trim Fourdrinier paper machine with variable speed electric drive, ran 600 feet; with beaters, jordans, and Bird screens.

4 story complete Bag Plant with Machines.
Steam and Electricity.
Excellent buildings, concrete and brick.
150,000 square feet floor space.
Building and foundation for 160" paper machine.

For Particulars Write

FRANK H. DAVIS CO.,
175 Richdale Ave. CAMBRIDGE, MASSACHUSETTS

HARDY S. FERGUSON & COMPANY
CONSULTING ENGINEERS
200 FIFTH AVENUE NEW YORK CITY

Hardy S. Ferguson—*Member A.S.C.E. A.S.M.E. E.I.C.*
Moses H. Teaze—*Member A.S.C.E. A.S.M.E. E.I.C.*

Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of
- PULP AND PAPER MILLS AND OTHER INDUSTRIAL PLANTS
- STEAM AND HYDRO-ELECTRIC POWER PLANTS
- DAMS AND OTHER HYDRAULIC STRUCTURES

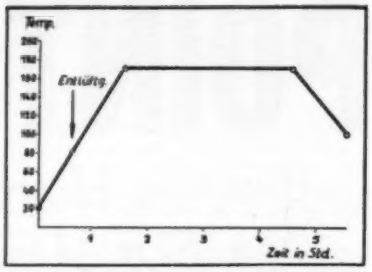
were actually converted into polymeranalogous cellulose, the structure of which in Schweizer's reagent was identical with that of the original xanthogenates in dilute solution. The varying properties of xanthogenate solutions are therefore dependent on the size of the macromolecules (of which these solutions contain mixtures). In the ripening process the viscosity increases since xanthogenate groups are split off by saponification. H. Staudinger and G. Daumiller. Ber. 71, 1995 (1938) through Papier-Fabr. 37, Abstracts 69 (1939).

Newsprint and News Ink

The laboratory method of printing in determining the quality of newsprint and news ink is that developed by C. Bendtsen in Denmark, and applied in Sweden at Hallsta. A weighed amount of ink is spread evenly upon a glass plate, using a soft rubber roll. Circular paper samples are placed on the inked surface. One circular sample in each case is protected from the ink. The samples are covered with a newsprint sheet, and a weighted rubber roll is drawn over the samples under standardized conditions. After removal of the newsprint sheet, the inked samples are removed by forceps and allowed to stand for a definite time period. Strike-through and degree of blackness are then measured by the use of an opacimeter. The reflection values of samples of the non-printed paper, and the printed and non-printed sides of the inked samples are also measured. The following factors were investigated in connection with printing results: ink quality, pressure of the roll, number of times roll is passed over sample, absorption of ink by the ink distributing roll (rubber or gelatin), the time period elapsing between printing the sample and the measurement of reflection, and the influence of temperature. "Specific strike-through" of a paper is explained in terms of basic weight, quantity of ink on the glass plate, and the amount of ink taken up by the paper. Comparative studies with various newsprint samples of different origin and with steel rolls (instead of rubber rolls) were made. The quantitative relationship between ink quantity, degree of blackness, and strike-through, and the advantages of a grayish instead of deep black printing are discussed. Gösta E. Carlsson, Svensk Papperstidn, 42, 182-95 (1939), through Bull. Inst. Paper Chem. 9, No. 10, 457 (1939).

Alkaline Delignification of Beechwood

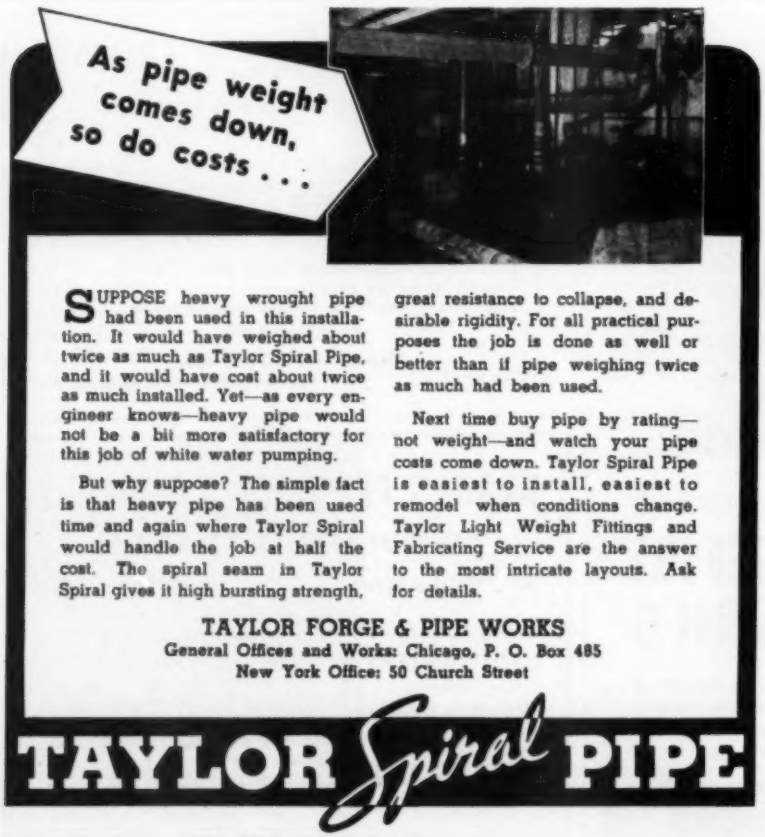
Another comprehensive study. The beech wood used gave the following analytical data: 0.58% ash; 0.93% alcoholic extractives, 22.86% lignin (Halse's method); furfural number, 14.59; 52.2% crude cellulose (by Heuser-Cassens method), with mannans and galactans absent. The temperature curve of all cooks is shown, and five other curves show the influence of the concentrations of Na_2O in the liquors on the yields of fine stuff and coarse pulp, on furfural, copper number and lignin, and on degree of whiteness, on thickness—swelling volume (Dicken quell volumen). (The authors use "sodium" instead of Na_2O.) A



graphic comparison is also made on the correlation of lignin content with folding endurance and breaking length. Two series of carefully standardized cooks were run in each case. In series (A), a group of sulphate cooks, there was a constant ratio in terms of "sodium" of 65% as NaOH, 20% as Na_2CO_3 and 5% as Na_2S. However in the liquors used, the "Sodium" concentration varied from 2.0% to 5.0%. The optimum concentration was about 3% (i. e., this led to the maximum yields). The strongest pulps, however, were obtained when the "sodium" concentration was about 2.4%. In series (B) a group of soda cooks, with 90% of the "sodium" as NaOH and 10% as Na_2CO_3, the highest yields were obtained with 2.3% "sodium" in the liquors, and in general the strongest pulps were obtained with about this same concentration. These results are given in two series of extensive tables. Invariably series (A) gave stronger pulps (under optimum strength conditions than did series [B]). The yields of fine stuff in (B) were somewhat higher, and the degree of whiteness was not markedly different (although somewhat higher in [B]). In the case of strength tests, the sulphate pulps run much higher than do the soda pulps. For example, the pulps of series (A) showed a 20.5% higher breaking length, 22.3% higher stretch, 59% higher folding endurance, 22.4% higher bursting strength, 12.4% higher sheet thickness, and 4.7% higher thickness—swelling volume than did the pulp of series (B). However, the latter shows less lignin and pentosans. In series (A) there is a fairly sharp maximum for folding endurance when the lignin is about 1.6%; for (B) when the lignin content is about 2.4%. The authors are of the opinion that both types of pulp (i. e., beech sulphate and soda) should find a use in the paper industry. G. Jayme, H. Wagenbach, and W. Deloff. Papier-Fabr. 37. Tech. Wiss. Tl. 229-35; 240-3 (1939).

Physiological Action of Organic Solvents

This takes up those organic solvents used in the paper industry, which are used largely in conjunction with resins (in impregnating paper) and in foam prevention. The relative toxicities of the common chloro-derivatives of the simple hydrocarbons are listed. Of these methylene chloride is the least, and hexachloroethane (C_2Cl_6) is the most poisonous. Of the esters, the formates are the most toxic. Usually derivatives formed from ethylene oxide are harmless, but dioxane is a mild narcotic. Benzol and the xylols have the same toxic action. Other solvents are discussed briefly. Nine references are given. Anonymous. Wochbl. Papierfabr. 70, Tech Tl. 227-9 (1939).

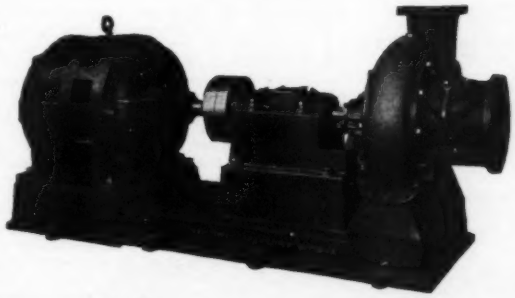

As pipe weight comes down, so do costs . . .
SUPPOSE heavy wrought pipe had been used in this installation. It would have weighed about twice as much as Taylor Spiral Pipe, and it would have cost about twice as much installed. Yet—as every engineer knows—heavy pipe would not be a bit more satisfactory for this job of white water pumping.
But why suppose? The simple fact is that heavy pipe has been used time and again where Taylor Spiral would handle the job at half the cost. The spiral seam in Taylor Spiral gives it high bursting strength, great resistance to collapse, and desirable rigidity. For all practical purposes the job is done as well or better than if pipe weighing twice as much had been used.
Next time buy pipe by rating—not weight—and watch your pipe costs come down. Taylor Spiral Pipe is easiest to install, easiest to remodel when conditions change. Taylor Light Weight Fittings and Fabricating Service are the answer to the most intricate layouts. Ask for details.
TAYLOR FORGE & PIPE WORKS
General Offices and Works: Chicago, P. O. Box 485
New York Office: 50 Church Street
TAYLOR Spiral PIPE

The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users

A millful of Morris . . .

Many a mill uses Morris—for pumping clear and white water, thick and thin stock, for chemicals, boiler feed, general service and fire protection. *Are you having trouble with your present pumps?* Ask Morris about their special purpose pumps. *Do you want higher efficiencies?* Ask Morris about their guarantees. *Do your present pumps wear out unduly fast?* Ask Morris about their special wear-resisting alloys. *Are you considering the purchase of new pumping equipment?* Be sure to get a Morris quotation before you decide. Morris bulletin 166 on pumps for paper and pulp mills will interest every plant engineer. Copies sent on request.

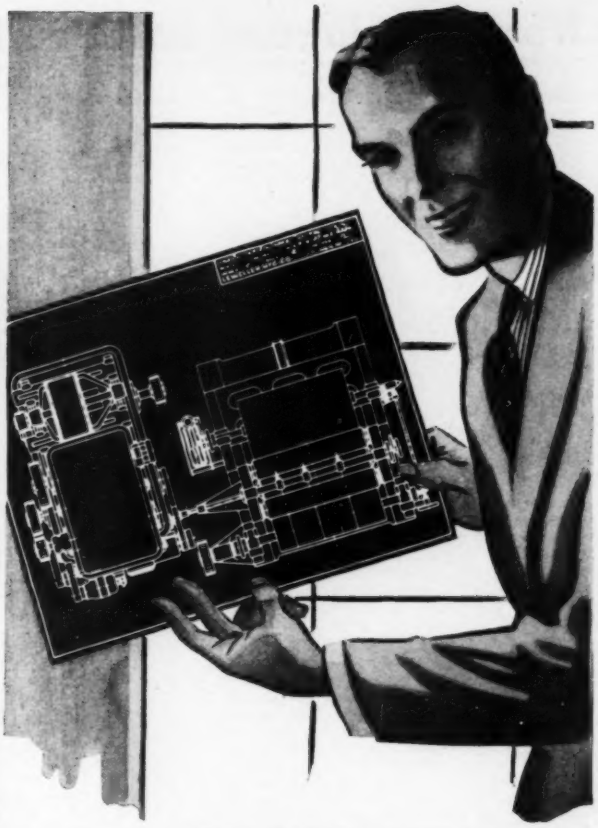


Paper Pulp needs a "thoroughfare" pump

Thin or thick stock encounters no pockets, bottle-necks or detours in Morris Non-clogging Pumps. Not only do these pumps assure trouble-free operation with liquids containing pulpy materials, but in addition, their design permits direct drive by high speed motors with astonishingly small hydraulic losses and with long continued maintenance of high initial efficiency. For complete details of these units, write for Morris Bulletin 166.

MEMBER

For authoritative recommendations on any pumping problem, write to Morris Machine Works, Baldwinsville, N. Y. Export Office: 30 Church Street, New York.



OCCUPATION: **A Lewellen Representative**

DUTY: **To solve your speed control problems**

● And, what an *important* service to you! For, solving your speed control problems means *Increased Production* at *Lower Costs* and an *Improvement in the Quality of Your Product.*

Why not call a Lewellen Representative today? You'll have the assurance that your problem, large or small, is in the hands of the recognized leader in speed control engineering.

New catalogs describing Lewellen Variable Speed Transmissions and Lewellen Variable Speed Motor Pulleys are yours for the asking.

LEWELLEN MANUFACTURING CO., COLUMBUS, INDIANA

Lewellen knows speed control

●

LEWELLEN

Variable Speed { TRANSMISSIONS / MOTOR PULLEYS

New Catalogues and Publications

Cameron Machine Co., Brooklyn, N. Y. —A well-illustrated 23-page booklet describing the company's mill winders and rewinders has been issued lately by this concern. The booklet explains the various features of the equipment and contains many full-page illustrations of the different "Camachines" available.

Flexrock Co., Philadelphia, Pa.—"Rockflux," a new acid-resistant floor resurfacer, is described in a new folder recently issued by this company.

General Electric Co., Schenectady, N. Y.—A series of bulletins of interest to industry in general have been issued recently by this concern. Capacitor motors for various types of pumps (Bulletin GEA 2420), oil blast circuit-breakers (GEA-2426B), and metal-enclosed switchgear (GEA-2596A) are a few of the subjects covered by the bulletins. All the bulletins are well-illustrated and are punched for loose-leaf filing.

International Nickel Co., Inc., New York, N. Y.—Basic information on mechanical, corrosion-resistant and other properties of rolled nickel, Monel, and other high nickel alloys produced by this company, is contained in a new folder recently issued by this concern. There is a great amount of technical information of value and interest contained in the release.

Moline Malleable Iron Co., St. Charles, Ill.—A new and comprehensive general catalogue (No. 9) has been issued by this company. The 134-page release, entitled *Moline Chains,* is an extremely well-laid out piece of work and contains, in addition to many interesting photographs of the company's plant and operations, extensive data relative to elevator buckets, various types of chains, sprockets, keyways and keys and attachments. There are also detailed cross-sectional drawings and installation photographs. Price lists are included.

Morse Chain Co., Ithaca, N. Y.—Bulletin 75 is a convenient, compact edition of power transmission data. Included in this bulletin's twelve informative pages are specification tables and capacity curves for a new roller chain, design data on the latter, features and design of the Morse silent chain and information regarding additional Morse power transmission products.

Nash Engineering Co., South Norwalk, Conn.—An entirely new kind of pump—the Nash glass centrifugal—is described interestingly in a new publication released by this company. The glass pump is described as being heat and shock resisting and it is stated that hot acids or brine cooled liquids may be pumped with equal facility. Complete pictorial and written data are included in the bulletin.

Oster Manufacturing Co., Cleveland, Ohio—A well-illustrated new catalogue (No. 39-A) on the die-stocks, portable pipe threading machines, portable bolt threading machines, and various other machines used for pipe threading and die grinding has just been put out by this firm. The concise written material and the numerous photographs, in addition to specification data, make this release a thing of value to any manufacturer.

Reliance Electric and Engineering Co., Cleveland, Ohio—This company's "V•S" drive—an all-electric, adjustable-speed drive for alternating-current circuits—is described by well-written matter and attractive illustrations in a new brochure just issued by the company.

Revere Copper and Brass, Inc., New York, N. Y.—A new catalogue (No. 29-B) which describes by means of well-written literature and illustrations, the features, adaptations and uses of the company's copper and brass pipe and tubing has been issued recently by this firm. There are many installation views included in the release which also contains dimensional tables and other data concerning the products.

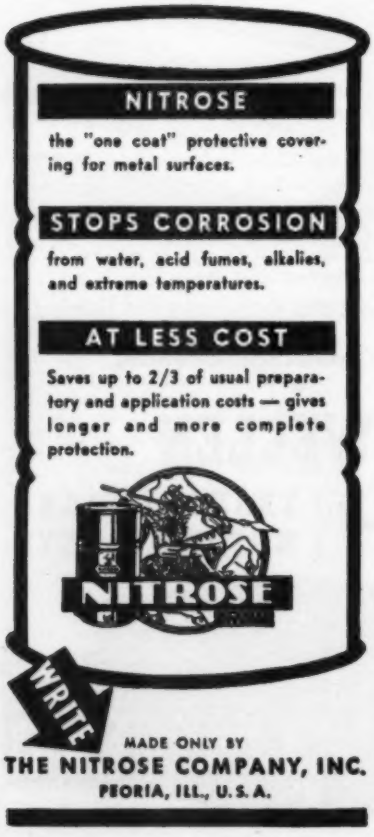
Roots-Connersville Blower Corp., Connersville, Ind.—A new bulletin (40-B15) contains data and descriptive matter relative to the company's "Cycloidal" rotary displacement liquid meters and liquid motors.

Joseph T. Ryerson & Son, Inc., Chicago, Ill.—A new 1939 stock list (No. 2) of Ryerson certified steels is now available from the company.

Wm. B. Scaife & Sons Co., Oakmont, Pa.—The new 12-page bulletin just issued by this company describes in detail the various types and styles of pressure water filters and their application in industry. There are thirty pictures in the release and these, together with the written information, make it a thing of value for anyone interested in pressure water filters.

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.—This firm has just published its new pyrometer and resistance thermometer catalogue (No. 1101E) which contains descriptions of a number of new instruments including self-balancing indicating controller, self-balancing indicator with "in balance" signal, recorder controllers, two-point indicating controller, multiple type indicating controller and cabinet type indicator. The catalogue is well-illustrated, well-written and well-laid out.

United States Rubber Co., New York, N. Y.—A new 36-page booklet, *Belting Biographies* represents a novel method of cataloging the company's belting products in that, instead of merely listing the various belts in conventional style, the booklet shows case histories, dramatically illustrated. These depict U. S. installations, large and small and in industries ranging from the manufacture of spaghetti to heavy mining and industrial operations. In addition the release contains much technical information, including data on the selection of the proper belt, installation, speed of operation, pulley size, tension, carrying capacity, etc., as well as numerous types of transmission drives, and conveyor layouts.


NITROSE
the "one coat" protective covering for metal surfaces.
STOPS CORROSION
from water, acid fumes, alkalies, and extreme temperatures.
AT LESS COST
Saves up to 2/3 of usual preparatory and application costs — gives longer and more complete protection.
NITROSE
WRITE
MADE ONLY BY
THE NITROSE COMPANY, INC.
PEORIA, ILL., U.S.A.

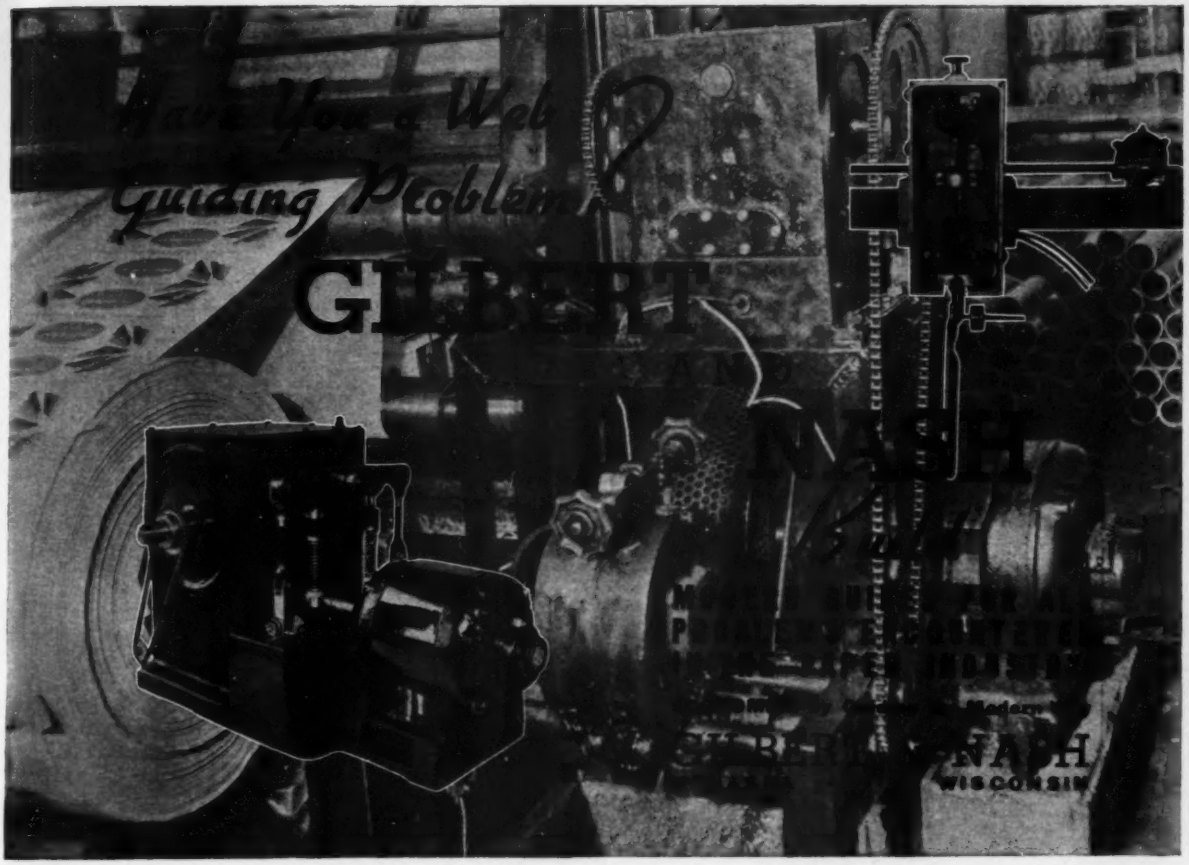
BOOKS

Blue Book of Southern Progress—The 1939 edition of this publication, containing statistics of various kinds on the resources of the South and Southwest, has made its appearance. Among the major subjects treated statistically in this work are: Manufacturing, Textiles, Agriculture, Mineral Production, Construction, Electric Power, Aviation, Railroads, Foreign Trade, Banking, Area and Population, State Officials, and an Economic Summary—(1) of the United States, (2) of the South, (3) by states. The book, published by Manufacturers Record, Baltimore, Md., is priced at one dollar a copy.

Industrial Market Data Handbook of the United States—The U. S. Department of Commerce has announced the publication of the Industrial Market Data Handbook of the United States, a handbook containing complete figures on industrial production, employment, value of products, cost of material, fuel and power, and output per wage earner for each of the 3,070 counties in the United States, and for every city of more than 10,000 population. The figures in the handbook pertain to 1935, the latest year in which information in this form is available. Data in the handbook have been selected with the aid of many marketing executives. Included in the handbook is a tabulation of the county locations of 169,111 manufacturing plants by kinds of industry. Parallel tables covering the mining industry with a county location table for each of the 23,000 mines by type of mine are also in the handbook. The publication also contains information dealing with channels of distribution and manufacturing operation costs, as well as a key table on wholesale operation in a number of heavy industries.

The handbook, prepared as a co-operative study of the Bureau of Foreign and Domestic Commerce, the Census Bureau, and the Bureau of Mines, is such a monumental piece of work that a copy of it should be in the hands of every industrial organization or other agency interested in knowing more about industrial markets. Bound attractively in buckram, the book, containing more than 900 pages, is priced at $2.50 a copy. It can be obtained from the Superintendent of Documents, Washington, D. C., or from any District Office of the Bureau of Foreign and Domestic Commerce located in principal centers of the United States.

Medicolegal Phases of Occupation Diseases—This book, written by Dr. C. O. Sappington and published by the Industrial Health Book Company, 540 North Michigan Avenue, Chicago, Ill., presents in handbook form the industrial, insurance, medical and legal interrelations of occupational diseases from origins and causes to disabilities and costs. The book, containing 30 chapters, is arranged in four parts, namely: Industrial, insurance, medical, and legal. In addition, the volume contains an extensive appendix which is devoted largely to the presentation of abstracts of state laws and of legal decisions, and a digest of workmen's compensation laws by states. It is a volume of about 400 pages, each 5¾x7¾ in., bound in cloth or in semi-flexible cover. The price of the cloth bound book is $2.75 a copy. It may be obtained direct from the publisher.



KNIFE GRINDING

MOST NEARLY FRICTIONLESS — SMOOTHEST RUNNING
SHORT LENGTH, DOUBLE STRENGTH CONSTRUCTION

The New Covel-Hanchett Traveling Wheel Grinder

The features of short length, double strength, smooth running frictionless operation are unquestionably the features which will provide both the most economical and the most accurate grinding service in any field. These features have been developed to an unusual degree in the latest Covel-Hanchett automatic grinders, with preloaded precision ball bearings, patented automatic force feed protected lubrication, extra strength working parts, all in a compact, oversize operating mechanism which is far above the usual rules of engineering standards. The latest Covel-Hanchett grinders establish new standards of their own, proved in the great majority of the up-to-date paper mills.

COVEL-HANCHETT CO.
Big Rapids, Michigan, U.S.A.

Full Description Upon Request

CURRENT MARKET QUOTATIONS

RAGS (Domestic)
f. o. b. New York City

NEW RAGS — *per cwt.*

Blue Overalls	4.75 to 5.00
Corduroy	2.25 to 2.50
Cottons—	
Washables, No. 1	1.60 to 1.75
Fancy Percales	3.10 to 3.25
New Soft Blacks	3.50 to 3.75
New Light Seconds	1.60 to 1.75
New Dark Seconds	1.50 to 1.60
Khaki Cuttings—	
Mixed	2.75 to 3.00
O. D.	3.25 to 3.50
New Canvas	7.00 to 7.25
New Mixed Blacks	2.25 to 2.50
Shirt Cuttings—	
New White No. 1	6.75 to 7.00
Silesias No. 1	4.75 to 5.00
New Unbleached	6.50 to 6.75
Fancy	1.85 to 2.00

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	.95 to 1.00
No. 2	.65 to .70
No. 3	.55 to .60
Twos and Blues—	
Repacked	1.35 to 1.50
Thirds and Blues—	
Repacked	1.15 to 1.25
Miscellaneous	1.00 to 1.10
White, No. 1—	
Repacked	2.75 to 3.00
Miscellaneous	2.00 to 2.25
White, No. 2—	
Repacked	1.60 to 1.80
Miscellaneous	1.15 to 1.35

RAGS (Foreign)
ex dock New York City
(All Prices Nominal)

NEW RAGS — *per cwt.*

New Dark Cuttings	2.00 to 2.15
New Mixed Cuttings	2.00 to 2.25
New Light Silesias	4.15 to 4.35
Light Flannelettes	4.25 to 4.50
Unbleached Cuttings	7.00 to 7.25
New White Cuttings	7.00 to 7.25
New Light Oxfords	4.25 to 4.50
New Light Prints	3.00 to 3.25

RAGS (Foreign)
ex dock New York City
(All Prices Nominal)

OLD RAGS — *per cwt.*

No. 1 White Linens	7.00 to 7.50
No. 2 White Linens	5.75 to 6.00
No. 3 White Linens	4.25 to 4.50
No. 4 White Linens	3.00 to 3.25
No. 1 White Cottons	3.00 to 3.25
No. 2 White Cottons	2.25 to 2.50
No. 3 White Cottons	1.75 to 2.00
No. 4 White Cottons	1.25 to 1.50
Extra Light Prints	2.00 to 2.25
Ord. Light Prints	1.65 to 1.85
Med. Light Prints	1.60 to 1.70
Dutch Blue Cottons	1.75 to 2.00
French Blue Cottons	1.85 to 2.00
French Blue Linens	2.25 to 2.50
Checks and Blues	1.60 to 1.70
Linsey Garments	1.60 to 1.70
Dark Cottons	1.20 to 1.30
Old Shopperies	1.10 to 1.20

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	1.40 to 1.50
Domestic	1.30 to 1.40
Wool Tares—	
Light	1.30 to 1.40
Heavy	1.30 to 1.40
Bright Bagging	1.30 to 1.40
Manila Rope—	
Foreign	2.50 to 2.65
Domestic	2.90 to 3.00
New Burlap Cuttings	2.35 to 2.50
Jute Threads—	
Foreign	2.75 to 3.00
Domestic	2.75 to 3.00
Strings—	
Sisal	1.65 to 1.75
Soft jute	2.00 to 2.10
Mixed	.60 to .70

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	2.25 to 2.35
Ord. Hard White No. 1	1.75 to 2.00
Ord. Soft White No. 1	1.65 to 1.85
Soft White, Extra	2.20 to 2.30
Flat Stock—	
Stitchless	.70 to .80
Overissue Mags	.60 to .65
Solid Flat Book	.55 to .60
Crumpled No. 1	.45 to .50
Solid Ledger Books	1.30 to 1.40
Ledger Stock—	
White	1.05 to 1.15
Colored	.65 to .75
New B. B. Chips	.35 to .37½
Manilas—	
New Env. Cuts	1.60 to 1.70
New Cuttings	1.30 to 1.40
Sulphite Wrappers	.40 to .45
Bogus Wrappers	.35 to .37½
No. 1 Old Kraft	.65 to .75
News—	
No. 1 Wh. News Cuttings	1.25 to 1.30
Strictly Overissue	.50 to .55
Strictly Folded	40 to .45
No. 1 Mixed Paper	.32½ to .37½

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.40 -
Ground, cwt.	3.15 -
Powdered, cwt.	3.55 -
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 45.00
Dry, barrels, pound	.0350 to .0375
Bleaching Powder—	
Drums, cwt.	2.00 to 2.25
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	12.50 to 12.75
80-100 mesh (bags), lb.	13.50 to 13.75
Argentine, lb.	11.25 to 11.50
China Clay—	
Domestic Filler	
Bulk (mine) ton	6.50 to 12.00
Domestic Coating	
Bulk (mine) ton	11.00 to 20.00
Imported (ship side)	
Bulk (lump) ton	13.00 to 24.00
Chlorine—	
Tank cars (wks) cwt.	1.75 to 1.90
Gelatine (silicin) lb.	.38 to .44
Glye. (C.P.) drums, lb.	.1250 to .1300
Litharge, powd., bbl., lb.	.075 to .0775
Rosin (Gum)—	
New York, 280 lb. barrel	
E, per bbl.	5.40
F, per bbl.	5.70
G, per bbl.	5.90
WW, per bbl.	7.45
Rosin (Wood), per bbl., carlots	4.00 to 5.85
Salt Cake—	
Dom. bulk (wks) ton	12.00 to 13.50
Imp. bulk on dock—	
(Atl. ports) ton	14.50 to 15.00
Soda Ash—	
Bulk (works) cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—Ammonia,	
Solid, drums, cwt.	2.30-
Ground and flake, drums, cwt.	2.75
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.40 -
Pearl, barrels, cwt.	2.65 -
Paper (Sp.) bags, cwt.	2.50 -
barrels, cwt.	2.75 -
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	14.00 to 18.00
Imp. bulk, ton	20.00 to 40.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.03¼ to .05½
Calcium Pig., bbls., lb.	.05¼ to .05½
Zinc Sulphide, bbls., lb.	.07½ to .07¾

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached	2.55 -
Sulphate (Dom.) f. o. b. mill—	
Bleached	2.25 to 2.50
Kraft No. 1	1.75 to 2.00
Kraft, Southern, del.	1.35 to 1.60
Sulphate (Imp.) on dock—	
Bleached	2.50 to 2.85
Kraft No. 1	1.30 to 1.50
Kraft No. 2	1.20 to 1.30
Sulphite (Dom. & For.) On dock—	
Prime bleached	2.75 to 2.80
Prime easy bleach	1.95 to 2.15
Prime strong unbl.	1.80 to 2.00

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. mill)	20.00 to 23.00
No. 1 Imp. (On dock)—	
Moist	25.00 to 26.00
Dry	23.50 to 24.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	71.00 to 77.00
Chip	32.50 to 35.00
Chip, agl. mla. lined	45.00 to 47.50
Coated, white patent	
.016	62.50 -
.020 and heavier	57.50 -
Kraft liner	45.00 to 47.50
News	32.50 to 35.00

	per cwt.
Book (eased)—	
No. 1 Glossy Coat	11.30 to 12.75
No. 2 Glossy Coat	9.70 to 11.00
No. 3 Glossy Coat	8.60 to 10.00
No. 4 Glossy Coat	8.05 to 9.25
No. 2 Offset	7.45 to 8.50
A Grade M. F.	6.30 to 8.25
A Grade Super	6.55 to 8.50
B Grade M. F.	5.80 to 7.75
B Grade Super	6.05 to 8.00
C Grade M. F.	5.55 to 7.50
C Grade Super	5.80 to 7.75
D Grade M. F.	5.25 to 7.00
Ivory & India	.50 cwt. extra

	per cwt.
Bonds (Rag Content)—	
100% Rag	
Ext. No. 1	39.10 to 46.00
100% Rag	31.05 to 36.50
85% Rag	
75% Rag	23.60 to 27.75
65% Rag	20.50 to 25.00
50% Rag	17.55 to 21.50
25% Rag	14.65 to 17.75
Regular Colors	1.00 cwt. extra

	per cwt.
Bonds (Sulphite)—	
No. 1	8.60 to 10.50
No. 2	7.70 to 9.50
No. 3	6.75 to 8.25
No. 4	7.00 to 8.50
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	12.25 -
Bleached (25 lb. up)	11.25 -
Unbleach (25 lb. up)	9.50 -
Greaseproof—	
Bleach. (25 lb. up)	9.25 -
Unbleach. (25 lb. up)	8.75 -
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	9.75 to 12.00
No. 2	8.90 to 10.75
No. 3	7.90 to 10.00
No. 4	8.20 to 10.00

	per ton
News—	
Rolls (Contract)	50.00 -
Rolls (Spot)	(nominal)
Sheets	58.00 -

	per ream
Tissues (Carlots)—	
White, No. 1	.83¼ -
White, No. 2	.60 -
Anti-Tarnish M. G.	.67¼
Colored	.77½ -
Kraft	.67½ -
Manila	.60 -
Napkins, semi-crepe (12¾ lb. to M shts.) per cs.	.41 -
Napkins, full crepe and emb'sed (12¾ lb. to M shts.) per cs.	.43¼ -
Toilet, Bleached (M shts.) per cs.	5.80 -
Toilet, Unbleached (M shts.) per cs.	3.05 -

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.65 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	4.75 to 5.25
Super-Standard	4.12½ to 4.62½
Northern Standard	4.00 -
Southern Standard	3.25 to 3.50

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f. o. b. mill)

	per cwt.
Bleached papers—	
M.F. & M.G. Waxing, 30 lb. (Carloads only)	5.75 -
(10,000 lbs.)	6.00 -
Drug wrapp. 35 lb.	6.00 -
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.25 -
No. 1 Butchers	4.50 -
No. 1 Imit. Parch & Dry Fin. Groe. Sulphite 30 lb.	4.875 -
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.625 -
Steam Finish, 50 lb.	3.50 -
Water Finish, 40 lb.	4.25 -
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	4.75 -
Envp. Mla., Sub. 16-28 (No. 2)	4.50 -
Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.00 -
No. 2	4.75 -
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	5.25 -
Grade B-25 lb.	4.75 -